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FERRANTI

NEWS IN BRIEF**Gchess \$50,000
program offer**

A FRESH challenge has been issued to developers of chess-playing programs. Volmac, a software house in Utrecht, Holland, has offered \$50,000 to the designers of a program which can defeat grandmaster Professor Max Euwe, a former world champion.

The offer is open until January 1, 1980, and calls for the program to win more than two games out of a four-game match.

Paris debut

THE 8-bit bus version of the Intel 8088 16-bit micro, first previewed in Computer Weekly 15 months ago (Micro News, November 24, 1977), is due to make its debut at the Paris Salon des Composants next month. It is called the 8088.

Security games

A THREE-DAY study programme on computer security is to be held by consultant Adrian Norman in Eastbourne from March 12 to 14. Participants will be given the chance to put theory into practice by playing games of attack and defence on imaginary systems. The course is being run by European Study Conferences of Rutland.

The Immos race

THE race to have an Immos factory in their area is expected to have attracted about 100 local authority entries, covering a possible 200 sites, by the time the closing date for completed questionnaires is reached this week. Consultants PA International will be sifting the entries and the first Immos site is expected to be announced in April.

Modcomp in talks

NOW that Modcomp has lodged restated accounts for 1973 to 1978 with the US Securities & Exchange Commission, talks are set to resume with two large multinationals, believed to be Thorn and Northern Telecom.

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Consultancy opportunities for computer clubs

THERE is scope for computer clubs to subsidise their existence by doing consultancy and programming work for organisations wanting to get their own low cost systems running.

This emerged at the first meeting of SEL-MIC, the South East London Microcomputer Club, at South East London College last week, when a member, Mike Hutchings, said he knew of two organisations that were looking for help from amateurs.

Many amateurs are prevented by their employers from doing outside work, or are

bound by contracts requiring management checking of all outside work. But it was suggested they could collaborate with other club members on projects that would benefit the club as a whole.

At this first meeting they owned discovered that between them they owned 11 different types of microcomputer system, including Intersil IM8100, Nascom, and Pats. The organisers hope that at least one of each type will be brought to the club's next meeting on Wednesday, March 21, at South East London College. Anyone wanting to

take along a machine should phone John Williamson on 01-850 4185.

There were members of several other clubs at the meeting, including the Amateur Computer Club, South East London, North Kent and Medway Towns Amateur Computer Club; also several members of the Radio Society of Great Britain, who are interested in getting on the air with a computer, possibly using one of the Oscar series of satellites put up for amateurs by NASA.

**Users seek code
for installations**

A CODE of practice for quality assurance in computer acquisition and installation is one of the firm recommendations made in a draft report to the National Computer Users Forum by its standards working party. The NCUF discussed the report this week and will be taking it to the March 29/30 meeting in Brussels of the Conference of European Computer User Associations. CECUA was recognised late last year by the EEC Commission as the official representative organisation for computer users in Europe. (CW, December 7, 1978). The forum is the UK member of CECUA and is examining the whole area of standards on behalf of CECUA.

The code of practice is seen by the working party as more acceptable than a set of formal standards and it believes that testing and certification centres should be set up to ensure that such a code is adhered to.

The code would apply to quality assurance of the feasibility study, the system specification, procurement procedures, the production of the hardware by the manufacturer, and then testing, commissioning, acceptance, training, maintenance and the post-implementation review.

Another major recommendation in the report is that computer environment standards should be established so that accommodation can be designed to meet future as well as current requirements without major structural changes. The assumption is that computer suites last much longer than computer equipment.

The report also discusses in detail the progress made towards standardisation in three other areas—portability, data interchange and open systems interconnection, OSI. The report calls for greater pressure to be applied to the International Standards Organisation and CCITT to co-operate more closely in the development of OSI standards.

Meanwhile, the members of the steering committee that will guide the work of the Data

Communications Protocols Unit set up by the Department of Industry (CW, February 22), have been named by the DoI. Chairman of the committee is Morley Sage, director of computing services at Southampton University. Sage is also a member of the computing sector working group of the DoI's Computers, Systems and Electronics Requirements Board. Other members of the committee are Roland Rosner of the Computer Board's network unit, Ron Clark of the Inter Bank Research Organisation, John Jarvis of Patel, Brian Taylor of Dor, Charles Portman of ICL, Derek Thatham of the CCA and Frank Taylor of BSI. There will also be an assessor from the Post Office.

**Fault
free
AS/6**

This unfamiliar looking CPU is an Intel AS/6, the more powerful Japanese built alternative to the IBM 3032. As reported exclusively in Computer Weekly, the first organisation in the UK to install an AS/6 is the Co-operative Insurance Society in Manchester (CW, February 1). Donald Stott, the society's DP manager, seen here with the machine, says the reasons for the CIS decision to replace its 370/158 with an AS/6 rather than a 3032 include quicker delivery, the lower cost of a four Megabyte AS/6 compared with a 3032 of the same size, the lower cost of upgrading, and the air cooling and built-in frequency conversion which make the AS/6 less costly to install.

Stott ran 12 hours of continuous tests under OS/MFT on the AS/6 and then disconnected the 158. In the six weeks since then, CIS has not had one fault with the AS/6. The machine is manufactured by Hitachi to Intel's specifications.

MVS on Ite's answer to 4341

IN an attempt to offer IBM users a system with a significant plus point over the highly price competitive IBM 4341, Ite has announced MVS support with its latest addition to the Advanced System series, the AS/3-5.

No UK prices have been announced yet for the AS/3-5, but US prices include \$600,000 for a standard two Megabyte AS/3-5 compared with \$245,000 for a two Megabyte 4341. For the extra cost the AS/3-5 customer gets up to 22% more performance than the 4341, and the capability to expand memory up to eight Megabytes compared with the four Megabyte maximum on the 4341. But each extra Megabyte for the AS/3-5 costs \$75,000 in the US compared with a mere \$15,000 for each extra Megabyte on the 4341.

However, Ite points out that the AS/3-5 equals the 370/158-3 in performance and that its extra power and memory capacity compared with the 4341 enable it to run MVS "comfortably". IBM does not support MVS on the 4341.

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COMPUTERVIEW

Counting
the cost
of a strike

SO, ushered in with the dawn of the age of information technology is an awareness of the strategic role of the computer, which is rapidly becoming a central feature in all business activities — in industry, commerce and above all in central and local government.

If data processing is disrupted for any reason, then the cost can be high, in terms of lost orders, delayed payments, human hardship and even perhaps a threat to national security.

Whenever a computer system goes down the costs of failure are not simply limited to those of repair. Lost processing time means delays, rescheduling of work and increased risk of error, and possibly revenue lost forever.

We saw in last week's Computer Weekly the first major use of the computer as a powerful bargaining weapon by the two largest civil servants unions, the Civil and Public Servants Association and the Society of Civil and Public Servants.

All government departments use the computer extensively, and a lengthy dispute by various operations staff could swiftly and effectively cripple the country, as described by Ken Thomas.

The police would not be able to check stolen cars, VAT, National Savings, Social Security — the list is a long one, the effects widespread.

The sole concession made by

COMPUTER service engineers could well qualify for the title "The Forgotten Breed" — except perhaps by the anxiously pacing DP manager as deadlines get ever closer.

Considering the critical role of the service engineer, it does seem strange, just how little comment is made on his function. Like much of the equipment for which he is responsible, the engineer seldom receives his due care and attention.

The Institute of Data Processing Management, the organisation allegedly responsible for looking after the interests of the DP professional, is more at home staging "meet the operator" forums, micro seminars and privacy conferences than promoting close encounters with the serviceman.

Computer Weekly similarly seldom features the engineer. Supplements tend to concentrate on such matters as input techniques, storage media, ancillaries and accessories. Prob-

lems and techniques of the field engineer are rarely promoted. Engineering, it seems, is one notable field where trespassers are not encouraged. The National Computer Users' Forum is reportedly about to release a bulky survey on "Standards in Computing." As is standard in such reports, the issue of engineering support service has been avoided.

Even the ever-zealous Computer Users' Year Book makes no concession towards the engineer in its 70 or so fully comprehensive salary tables. Pay scales cover activities ranging from senior DP management to trainee DP operators. The engineer is, all too typically, excluded.

Should, however, such an engineering comparison table be compiled, the DP industry could well be in for a surprise.

Current rates, at least according to recent Computer Weekly job adverts, suggest that good engineers come with high price tags. The days of the serviceman arriving in a clapped out MGB ceased a generation or so ago. Rovers are now standard issue. Along with their electronic testers, engineers are now expected to travel with overnight bag ready to rush to any computing trouble-spot.

This jet-set activity could well account for the slow arrival on site in Furley of engineering assistance. Too many engineers could be sitting around sundry Heathrow air terminals. For the

DPM, engineering support is critical. However good the DP organisation, the personnel, software or systems, without competent and reliable engineering support, the whole exercise is vulnerable.

The more astute DP managers have known that lunching the service manager pays better dividends than accepting a bonus lunch from the sales manager. Meanwhile, DPMs all too often have to resort to strategic plays for getting prompt engineering response:

- Hinting to the sales team that unless service improves, the forthcoming upgrade could become a full-scale evaluation.
- Supplying the field engineer on arrival with a hot cup of coffee plus an equally hot punch girl supervisor ready to supply fresh packs of diagnostic cards on demand.
- Agreeing that the next preventive maintenance can be tackled in prime time.

Alone of all key computer personnel, the serviceman remains aloof and remote. Entry to the engineers' ranks from other DP areas is a non-starter. Likewise, few engineers cross the chip field and join the DP installation team.

It is time the engineer became a closer part of the DP industry. There is certainly an urgent need for both sides of the installation team to get together in the cause of improved performance and understanding.

1984 and all that

CONTRIBUTIONS from readers are welcome for our column of the funny things people say in the media about computers. We will pay £5 for each item we publish.

The new J.M. processor can store four million pieces of information.

Photo caption in the New York Times

The Computer with the largest memory built in the United Kingdom is the International Business Machines 1944 which is a multiprogramming computer with 16,777,216 bytes of main storage.

Official Book of Records, 1978

has resulted in substantial changes in the organisation of company and government methods. To revert to a manual system would be an extremely expensive, lengthy and laborious process, impossible in some cases.

The costs of changing are prohibitive — a road that few would wish to travel back along. Frequently, the full potential of a computer system is neither understood nor exploited. If a system is fully used then other issues such as privacy (if, and when, UK legislation is introduced) and security (to ensure the system is not misused) become important.

All those in DP face a rising tide of machines, each day becoming faster, smaller and more capable, handling most of the affairs of man. However, as recent events have shown, computer power is no longer just the technology.

We must carefully and urgently assess the role and position of the computer in today's society so that we ensure that we reap the benefits and not the whirlwind.

But the importance of the computer does not end here. Many large users are caught in a usage trap and have in many cases passed the point of no return. Over the years the widespread use of the computer

order for an ICL 4/40... system for measuring and response was introduced General Electric in the UK. The SRS 1000, a vast culmination of four years research at Syracuse University.

A Software Finance Brown, DP manager at Polson, said that he had spent £1/1 to work on the PL/I 30... A program which from CAP Europe for its efficiency of programs as shown to provide improvements of between 15% to 35%.

Generale and Credit Commercial de France. The GSI Group now has 40 big mainframes dotted around Europe, and 7,000 customers.

GSI UK, formerly CRC, will be provided with £1 million this year to buy new hardware and take on new marketing staff.

While the time sharing and market research services developed by CRC are now being sold on the Continent by GSI, GSI UK is starting to market here such GSI services as the International Dealer System, IDS, for automotive dealers.

These ten years have seen a transformation of the software industry — in scale, in range and above all in importance. It is at last widely recognized that the software industry has an importance far greater than just its size would imply.

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Logica continues its policy of working today in technologies the company believes will be vital tomorrow. Examples include the electronic office, with the establishment of the sister company, Logica VTS, to exploit the lead in word

Logica Holdings Limited
64 Newman Street
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Telephone 01-637 9111

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Sales HQ
moves to
London

● From front page
March 1978, on research, development.

"Even with that expense, we cannot offer a full range of products, so you could say we are in buying mode," says Bosch.

"We are doing research into several technologies, including laser and xerographic, and possibly also ink-jet already produce their own matrix printers, and we added a band printer. We are offering a complete line of chips to 2,000 lines.

"We are targeting our growth of 25% per annum. Europe is growing faster than that," said Bosch. By European customers, CTL, Nixdorf, Siemens, Honeywell, in the UK, to December turnover of 18% at \$118 million, profits on target for the full year.

GSI will offer the in-house systems to bigger users of Cybernet Timesharing, the long-established CRC division whose services are now sold throughout Europe by GSI. The intention is to complement the existing time sharing services by enabling users to run in-house systems that are currently handled by Cybernet's Sigma 9 installation at Slough.

With its Onsite service ADP offers its users the low-cost Digital Equipment 2020 mainframe which provides total software compatibility with ADP's DEC System 10 time sharing mainframes. With its competing service GSI will not be able to offer Sigma compatible machines, but has decided to provide its customers with a choice between DEC 2020 and IBM 4300 computers.

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GSI sees the new service gradually taking the workload off its three Sigma 9s, and no new applications are being developed to run specifically on the Sigmas. The machines have been maintained by Honeywell since it took over the RXDS customer base, and the maintenance contract with Honeywell runs until 1983.

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International Nascom Club gets under way

THREE Nascom users, Dave Hunt, Richard Beale and Howard Birkett, have agreed to run the International Nascom Microcomputer Club with the company's backing. The INMC was set up by Nascom to help users to exchange programs and tips.

Hunt, as manager of Henrys Radio in London, is a Nascom dealer and he also designed the graphics board and EPROM programmer that Nascom sales director Kerr Barland says should be available in

volume production in April.

Beale adapted Tiny Basic and several games for Nascom 1 from listings published in US hobbyist magazines, and Birkett has also adapted several well-known games, some of which are sold on cassette through Henrys.

This team aims to start by testing programs sent to the INMC by users and categorising them according to whether they are

debugged and documented, seem to do something interesting, or need help from others before they will run properly. Lists of programs with titles, descriptions, categories and how to contact the author would then be circulated to members, so that they would have some idea of what they would get for their copying and postage fee.

Barland said that the 1978 INMC membership fee would also cover 1979, to compensate for the lack of activity last year.

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GSI challenge to ADP's Onsite with IBM 4300s

IN-HOUSE mainframe processing facilities for time sharing users similar in concept to the Onsite service introduced to Europe last year by Automatic Data Processing are to be launched later this year by the GSI Group. Low-cost IBM 4300 series machines will be included in the mainframe kit offered to customers for use in-house.

GSI is the massive Paris-based bureau group, Générale de Service Informatique, which bought the UK's CRC Group in 1977, renaming it GSI UK.

GSI will offer the in-house systems to bigger users of Cybernet Timesharing, the long-established CRC division whose services are now sold throughout Europe by GSI. The intention is to complement the existing time sharing services by enabling users to run in-house systems that are currently handled by Cybernet's Sigma 9 installation at Slough.

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Ten years ago..

...Logica was formed Computer Weekly reported the event on the front page. Thank you Computer Weekly and thank you for ten years of reporting. Your consistent high standards have greatly benefited the computing industry.

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To mark his retirement from the editorship of Computer Weekly, and in recognition of all that he has done to make known the work of the BCS Specialist Groups, Malcolm Peltu last Thursday was presented by Alan Sutcliffe, chairman of the Specialist Groups Committee, with two books by Charles Babbage: "The Exhibition of 1851" and "The Bridgewater Treatise." Representatives of many of the 40 BCS Specialist Groups attended the presentation at BCS headquarters.

IEE honours Intel founder

THE Institution of Electrical Engineers' highest award, the Faraday Medal, is being awarded today (Thursday) to Dr Robert Noyce, chairman and co-founder of Intel.

The award is made annually to an individual who has produced notable scientific or industrial achievements in electrical engineering during the year.

Industrially, Intel's achievements are considerable, the corporation having increased its turnover during 1978 by

NEWBURY

SMART
MICRO-BASED
VISUAL DISPLAY
TERMINALS



Model 7008-7009

British design and manufacturer
Based on 8080A Microprocess-
sor
Two-page Memory 840
characters
24 Displayed line of 80
characters per line
Switchable Transmission
Speeds from 50 Baud to
19,200 Baud
Split Speed Transmission Mode
Dual Interface - CCITT V24
and 20/80 mA Current Loop
Hard Copy Printer Output
Protected Print Format - Blink
- Background or Half
Brightness
XY Cursor Address (send and
receive)
Roll or Page Mode
Video Output for External Moni-
tors
Full Character Editing Features
Block Transmission from Screen
by Line or Page
Green Phosphor Non-glass
screen



Model 7001-7002

24 Lines of 80 characters per
line
Selectable Baud Rates from 50
to 19,200 Baud
Dual Interface - CCITT V24
and 20/80 mA Current Loop
Teletype Compatible
Hard Copy Printer Output
Selectable Half or Full Duplex
Video Output for External Moni-
tors
Green Phosphor Non-glass
Screen



Model 7000

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MICHIE'S PRIVATEVIEW

Special boxes for special tricks



I EARLIER mentioned colour vision as a case where the basis of a cognitive activity is "hard-wired" in the neuro-anatomy of eye and brain (CW, November 23, 1978).

Language is another human behaviour where the strategy of "special boxes for special tricks" has been followed by biological evolution.

Investigators were at first confused by the clinical effects of brain injury on the ability to speak. This ability is lost as a result of damage anywhere in quite extensive regions of the cortex (outer layer) of the left half of the brain.

It seemed that the function must somehow be diffusely represented.

More detailed analysis has changed all that. The clue is that there are many different sub-functions of speech production, from vocabulary management and sentence construction to articulatory movements of tongue, lips, palate, etc, control of vocal chords and voice box, breathing control and so forth.

It is now established that injuries in different brain locations undermine speech production differently. So the design principle of "special boxes" is saved.

Let us take a look at some performance parameters of the brain, viewed as an information processing device. The maximum bit rates and bit storages shown in Table 1 are so low by present-day electronic standards as to be embarrassing.

Consider, in particular, the upper bound to the quantity of information that can be acquired and stored in a lifetime. It could be argued that acquisition of a few economically coded facts and principles might suffice to generate much larger quantities of explicit information, by high-speed deduction from the initial compact form.

But the discovery that the brain's calculational speed amounts to a mere 20 binary discriminations per second puts a stopper on that. The rate at which we can mobilise information by calculation is of the same order as the rate at which we can take it into store directly from the outside world.

It should therefore be possible to encode everything that a doctor knows about

medicine, or a meteorologist about the weather, or Joe Brown about rock-climbing, or Karpov about chess in a computer store of dimensions which, today, would be regarded as reasonable; with

Source	Estimation
1 Rate of information transmission along any input or output channel	30bps
2 Maximum amount of information explicitly storable by the age of 50	10 ¹⁰ bits
3 Number of mental discriminations per second during intellectual work	18
4 Number of addresses which can be held in short term memory	7
5 Time to access an addressable "chunk" in long term memory	2 secs
6 Rate of transfer from long term to short term memory of successive elements of one "chunk"	3 elements per sec

Table 1. Some information processing parameters of the human brain. Estimation errors can be taken to be around 30%. In the above, "bits" refers to units of information measurement, not to binary digits. Thus, 30 Yes-No decisions are sufficient to discriminate in a second one photographic portrait from an ensemble of a billion alternatives. The number of black-and-white dots scanned in the process is typically very much higher.

Sources - 1. Miller (1956) summarises the knowledge up to that date in *Psychology Review*, Vol 63, pp 81 to 97. Subsequent determinations are reviewed in any modern text in physiological psychology; 2. calculated from source 1 above (see text); 3. sources cited by Helstead (1978) in *Elements of software science*, Elsevier; 4. to 6. sources cited by Chase and Simon (1973) in *Cognitive Psychology*, Vol 4, pages 55 to 81.

retrieval from store being handled by routines highly sparing of processor time.

To do this, however, we may have to find better ways of storing and matching descriptions than as sequentially coded truth functional procedures.

Work in cognitive psychology challenges the assumption that the brain represents concepts definitionally - hence current interest in software features such as semantic nets and hardware devices such as parallel array processors for manipulating patterns. Far-reaching consequences for programming "expert systems" follow from some of these facts. Much can be gleaned from an important new book, *Pattern-directed inference systems*.

A form of "Broca's aphasia" results from a highly localised injury. The patient talks like an Aberdonian's telegram, omitting all the grammatical signposts like "the", "a", "up", "down", "off", "by", "with", "to", "from", "in", "on", "through", "this", "that", "of", "while", "when", "is", "are", "would", "will", and so forth, and also the grammatical inflexions which distinguish, say, "bite", "bites", "bit", and "bitten".

Since these people seem to understand the speech of others, it was at first thought to be a disorder of speech production, leaving comprehension unaffected.

This has now been disproved. These aphasics have their "grammar box" as totally inactivated or absent when listening as when speaking. But by inferring "likely meaning" from their knowledge of nouns, verbs etc, they manage to perform plausibly on comprehension tests.

Normal brains employ different retrieval mechanisms according to whether they are handling words of the first or second type - another instance of "special boxes for special tricks". Patients with the described aphasia, as expected, have only one word-retrieval mechanism and do not handle words of the first type at all - except to recognise that the words exist and belong to the language.

* Pattern directed inference systems, edited by D. A. Waterman and F. Hayes-Roth. Academic Press, 24 Oval Road, London, NW1.

SOFTWARE FILE-1

Online capability for end-users

THE information retrieval and reporting package Data Analyser has gained a significant new online capability in the form of a CICS extension. The extension is also available for its sister system, Audit Analyser.

With the new software, users of either package can create and submit report requests at the terminal, and subsequently examine the output. This capability was previously restricted to the IMS version, which uses IMS/DC facilities to achieve the same result.

Relatively unknown in this country, Data Analyser and Audit Analyser were developed by Program Products Inc in the US and are designed for much the same end-user applications as Informatics' Mark IV, Pan-sophic's Easytrieve, and Computer Associates' CA-Earl.

The same central software is used in each, the audit package

offering in addition tailored auditing routines.

World-wide, the packages enjoy a substantial user base, currently around 420. Usage in the UK is by contrast restricted to small but prestigious groups including Barclays Bank, Rank Xerox, Price Waterhouse, and Turner and Newall.

This is attributed by the UK agents, Coveford Data Systems, to the relatively minor marketing effort so far invested here. CDS took over the agency from Cera Consulting just over a year ago and this year plans a marketing drive which is aimed at doubling the number of users.

Concurrently with gaining the new online capability, the packages have been enhanced with an interface to Cullinane's IDMS database management system. Interfaces to IMS, DL/I, and Cincom's Total were already available.

European Blis/Cobol users' first meeting

THE first meeting was held last month of the European Blis/Cobol users' group. Held in the London offices of Software Implementation Ltd, it was attended by some 15 users and a representative from IPI, the Florida-based software house that wrote the system.

Chairman of the new group is Ian Duffell, of the Chloride Group. The secretary is Richard

Leyton, of SIL, and the technical co-ordinator, Tony Day, of Security Computing Services. Six UK organisations use Blis/Cobol directly. In addition software houses, including IPI and Security Computing Services, have supplied a number of turnkey systems based on the software.

Blis/Cobol supports multi-user Cobol on the Data General Nova and includes a sophisticated mainframe-type operating system. A version running on DG's MicroNova was announced earlier this year (Software File, February 1).

Blis/Cobol is to be offered on Lenn-Siegler's VDP-1000 business system (CW, December 1, 1978), following the signing of a contract between Lenn-Siegler's Data Products Division and IPI.

Package rental
THE DEC datatypes software house Time Utilising Systems, of Leicester, is offering its range of application packages on a rental basis to help minimise set-up costs for first-time DP users.

Bank adaptation
ASSEMBLER level software for Chubb Electronics' MDP range of automatic bank machines is being produced with assistance of Zeus-Harmer.

SOFTWARE FILE-2

UCC Seven released

AN OS operations management aid has been launched by the University Computing Company in Europe following the release of the software in the US last July. Called UCC Seven, the package is an automated production control system designed to improve data centre workflow.

Like Value's Apollo (Software File, May 11, 1978), an important feature of the package is automatic job submission. CPU jobs can be loaded automatically dependent on specified pre-conditions such as the date and the completion of other jobs.

The system database also caters for non-CPU activities such as data preparation. Both these activities and CPU work can be scheduled automatically, with prompts from the system when work becomes overdue.

Current production status can be investigated online.

MVS performance monitor from CPP

WITH MVS emerging as IBM's only large-scale operating system for the future, Computer Program Products has launched its first package specifically designed for total MVS performance monitoring.

The system is called CMF (Comprehensive Management Facility) and originates, like much of CAP-PP's performance-oriented software, from Boole and Babbage in the US.

Described as a family of products, CMF consists of a central or "master" monitor which controls a number of "submonitors." The latter performs most of the detailed analysis tasks

and may be switched on or off as required.

The master monitor enables these separate results to be correlated, so that a total picture of the system can be obtained. It is also responsible for activating the submonitors, either at regular sampling intervals or when particular events occur - for example, excessive TSO response time or a high paging rate.

Because of this architecture, CMF is said to incur the minimum possible operational overhead while facilitating a top-down approach to problem investigation.

Data collected by the system is available to the user in a number of forms, including real time online displays. The package also has a graphics facility, enabling plots, pie charts and Kiviat graphs to be produced on a line printer.

CMF is being offered on an

exchange basis to existing SMS/CUE users, costing £3,000 before May 1, and £5,665 thereafter. For new users, the corresponding prices are £10,665 and £13,330.

The equivalent IBM facility, RMF II, costs around £180 per month per CPU. CMF, argues CPP, offers significant advantages over the IBM product and is competitively priced.

Alternative Basic from Waterloo

A SECOND Basic interpreter will be developed for IBM's Series 1 minicomputer. Written by the University of Waterloo, Ontario, the software is said to run under the RPS operating system, occupying about 80K bytes of memory. It will be available in the US around April or May.

Reports say that the system will support six terminals on a 128K Model D processor, and up to 16 on a 256K Series 1. Designed for both educational and commercial use, the language will include structured programming commands and a variety of diagnostics, and will be accompanied by an editing

system. Last year, Gulf Computing Systems of Kuwait acquired worldwide rights outside the US to the only other Series 1 Basic interpreter extant (Software File, July 6, 1978). This system, Basic/1, is still sold within the US by Data Systems Inc. of Denver, Colorado.

PROGRAMMER NOTES

Spread the Gospel before it's too late

WITH silicon chips et al forcing their way into public awareness, one of the nicest consequences would be more widespread understanding of simple computer jargon.

I say "could" because personal experience to date has been more than somewhat disappointing.

Friends and relations, trying to be interested, cannot remember from one week to the next just what you said that software was. And any attempt to explain deeper mysteries causes their eyes to glaze over rapidly.

Judging by my own circle, the idea of hardware is grasped fairly easily, and most people have at least heard of programming. But I would accept no bets that they could successfully identify an example of either.

Nor are the respective functions of hardware and software understood at all, with the result that incidents in contemporary folklore such as the £1 million gas bill are blamed indiscriminately on "the computer."

Computing, of course, does

not enjoy a good public image. Programmers are still widely regarded as mathematical buffoons, and widespread misunderstanding of the capabilities of computer systems leads to misplaced anxieties about their application.

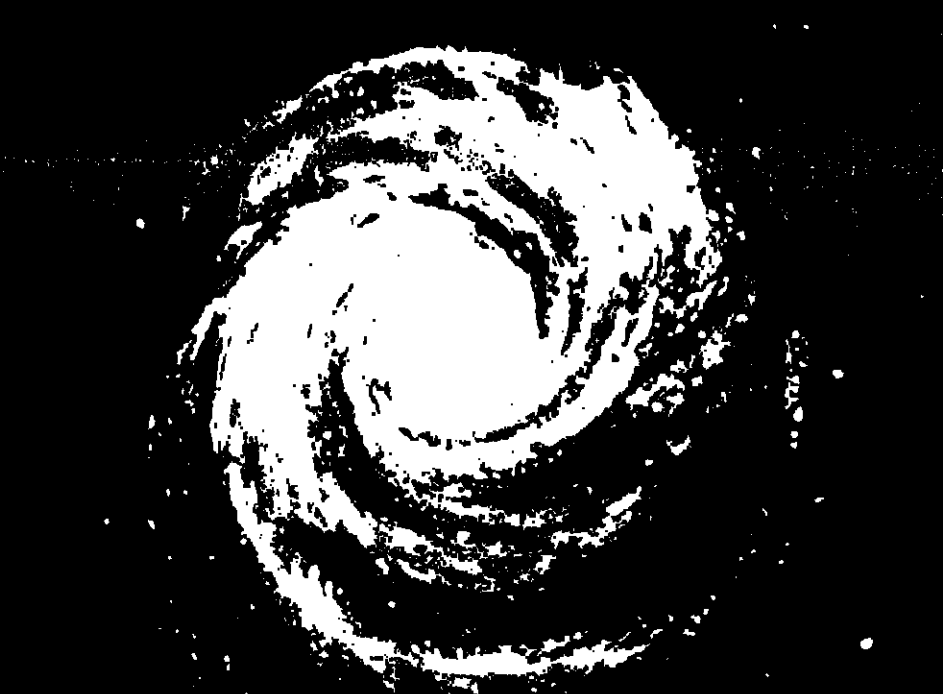
The fact is, I suggest, that computing is still seen as a "science" and this persuades people that it will be conceptually difficult to understand. Not only this, but they are somehow proud of their ignorance, falling into the scheme described by C. P. Snow in "The Two Cultures."

All of this, you may say, does not matter very much. And up until very recently you might have been right.

But computing is now forcing itself into a much more prominent position in society at large and a failure to grasp its essential concepts could lead to many problems.

If computing professionals are not to become the Morlocks of a future divided world, they should set about proselytising among the potential, Elot at no mean speed.

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Puzzler

MY youngest son recently brought home from school a rather unusual sum. The class had been doing multiplication, and one of the calculations had by chance produced all nine digits from 1 to 9 once only.

Here is the layout of the figures, with just the 4 given as a clue. Can you reconstruct the sum before turning to page 81.

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MICHIE'S PRIVATEVIEW

Special boxes for special tricks



EARLIER mentioned colour vision as a case where the basis of a cognitive activity is "hard-wired" in the neuro-anatomy of eye and brain (CW, November 23, 1978).

Language is another human behaviour where the strategy of "special boxes for special tricks" has been followed by biological evolution.

Investigators were at first confused by the clinical effects of brain injury on the ability to speak. This ability is lost as a result of damage anywhere in quite extensive regions of the cortex (outer layer) of the left half of the brain.

It seemed that the function must somehow be diffusely represented. More detailed analysis has changed all that. The clue is that there are many different sub-functions of speech production, from vocabulary management and sentence construction to articulatory movements of tongue, lips, palate, etc. control of vocal chords and voice box, breathing control and so forth.

It is now established that injuries in different brain locations undermine speech production differently. So the design principle of "special boxes" is saved.

Let us take a look at some performance parameters of the brain, viewed as an information processing device. The maximum bit rates and bit storages shown in Table 1 are so low by present-day electronic standards as to be embarrassing.

Consider, in particular, the upper bound to the quantity of information that can be acquired and stored in a lifetime. It could be argued that acquisition of a few economically coded facts and principles might suffice to generate much larger quantities of explicit information, by high-speed deduction from the initial compact form.

But the discovery that the brain's calculational speed amounts to a mere 20 binary discriminations per second puts a stopper on that. The rate at which we can mobilise information by calculation is of the same order as the rate at which we can take it into store directly from the outside world.

It should therefore be possible to encode everything that a doctor knows about

medicine, or a meteorologist about the weather, or Joe Brown about rock-climbing, or Karpov about chess in a computer store of dimensions which, today, would be regarded as reasonable; with

Source	Estimation
1 Rate of information transmission along any input or output channel	30bps
2 Maximum amount of information explicitly storable by the age of 50	10 ¹⁰ bits
3 Number of mental discriminations per second during intellectual work	18
4 Number of addresses which can be held in short-term memory	7
5 Time to access an addressable "chunk" in long term memory	2 secs
6 Rate of transfer from long term to short term memory of successive elements of one "chunk"	3 elements per sec

Table 1. Some information processing parameters of the human brain. Estimation errors can be taken to be around 30%. In the above, "bits" refers to units of information measurement, not to binary digits. Thus, 30 Yes-No decisions are not sufficient to discriminate in a second one photographic portrait from an ensemble of a billion alternatives. The number of black-and-white dots scanned in the process is typically very much higher.

Source: 1. Miller (1956) summarises the knowledge up to that date in *Psychology Review*, Vol 63, pp 81 to 97. Subsequent determinations are reviewed in any modern text in physiological psychology; 2. calculated from source 1 above (see text); 3. sources cited by Helstead (1978) in *Elements of software science*, Elsevier; 4. to 6. sources cited by Chase and Simon (1973) in *Cognitive Psychology*, Vol 4, pages 55 to 81.

retrieval from store being handled by routines highly sparing of processor time.

To do this, however, we may have to find better ways of storing and matching descriptions than as sequentially coded truth functional procedures.

Work in cognitive psychology challenges the assumption that the brain represents concepts definitionally — hence current interest in software features such as semantic nets and hardware devices such as parallel array processors for manipulating patterns. Far-reaching consequences for programming "expert systems" follow from some of these facts. Much can be gleaned from an important new book, *Pattern-directed inference systems*.

A form of "Broca's aphasia" results from a highly localised injury. The patient talks like an Aberdonian's telegram, omitting all the grammatical signposts like "the", "a", "up", "down", "off", "by", "with", "to", "from", "in", "on", "through", "this", "that", "of", "while", "when", "is", "are", "would", "will", and so forth, and also the grammatical inflexions which distinguish, say, "bite", "bites", "bit", and "bitten".

Since these people seem to understand the speech of others, it was at first thought to be a disorder of speech production, leaving comprehension unaffected.

This has now been disproved. These aphasics have their "grammar box" as totally inactivated or absent when listening as when speaking. But by inferring "likely meaning" from their knowledge of nouns, verbs etc, they manage to perform plausibly on comprehension tests.

Normal brains employ different retrieval mechanisms according to whether they are handling words of the first or second type — another instance of "special boxes for special tricks". Patients with the described aphasia, as expected, have only one word-retrieval mechanism and do not handle words of the first type at all — except to recognise that the words exist and belong to the language.

Pattern directed inference systems, edited by D. A. Waterman and P. Hayes-Roth. Academic Press, 24 Oval Road, London, NW1.

SOFTWARE FILE-1

Online capability for end-users

THE information retrieval and reporting package Data Analyst has gained a significant new online capability in the form of a CICS extension. The extension is also available for its sister system, Audit Analyst.

With the new software, users of either package can create and submit report requests at the terminal, and subsequently examine the output. This capability was previously restricted to the IMS version, which uses IMS/DC facilities to achieve the same result.

Relatively unknown in this country, Data Analyst and Audit Analyst were developed by Program Products Inc in the US and are designed for much the same end-user applications as Informatics' Mark IV, Panophic's Easytrieve, and Computer Associates' CA-Earl.

The same central software is used in each, the audit package

offering in addition tailored auditing routines.

World-wide, the packages enjoy a substantial user base, currently around 420. Usage in the UK is by contrast restricted to a small but prestigious group including Barclays Bank, Rank Xerox, Price Waterhouse, and Turner and Newall.

This is attributed by the UK agents, Covesford Data Systems, to the relatively minor marketing effort so far invested here. CDS took over the agency from Cura Consulting just over a year ago and this year plans a marketing drive which is aimed at doubling the number of users.

Concurrently with gaining a new online capability, the packages have been enhanced with an interface to Cullinane's DMS database management system. Interfaces to IMS, DLI, and Cincom's Total were already available.

European Blis/Cobol users' first meeting

THE first meeting was held last month of the European Blis/Cobol users' group. Held in the London offices of Software Implementation Ltd, it was attended by some 15 users and a representative from IPL, the Florida-based software house that wrote the system.

Chairman of the new group is Ian Duffell, of the Chloride Group. The secretary is Richard

Leyton, of SIL, and the technical co-ordinator Tony Day, of Security Computing Services.

Six UK organisations — Blis/Cobol directly, in addition software houses, including, and Security Computing Services, have supplied a number of turnkey systems based on the software.

Blis/Cobol supports multi-user Cobol on the Data General Nova and includes a sophisticated mainframe-type operating system. A version running on DG's MicroNova was announced earlier this year (see *ware File*, February).

Blis/Cobol is to be offered by Lear-Siegler's VDP-1000 business system (CW, December 1978), following the signing of a contract between Lear-Siegler's Data Products Division and IPL.

The software supports true in-situ updating and is said to be a result to be very fast when used to make program corrections. It is also efficient in its use of file space, re-using dead space at the first opportunity so that no separate reorganisation run is required.

Videtail, which is also available under DME2 on the 2850, is a companion product to Gresham's earlier 2903/4 systems: Videcob for Cobol editing, and Videmap for screen formatting.

2903 Filetab maintenance

AN online program maintenance system for ICL 2903/4 Filetab users has been developed by Gresham Computer Services. Called Videtail, it allows a standard ICL screen to be used for inputting and editing Filetab source code.

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SOFTWARE FILE-2

UCC Seven released

AN OS operations management aid has been launched by the University Computing Company in Europe following the release of the software in the US last July. Called UCC Seven, the package is an automated production control system designed to improve data centre workflow.

Like Value's Apollo (Software File, May 11, 1978), an important feature of the package is automatic job submission. CPU jobs can be loaded automatically dependent on specified pre-conditions such as the date and the completion of other jobs.

The system database also caters for non-CPU activities such as data preparation. Both these activities and CPU work can be scheduled automatically, with prompts from the system when work becomes overdue. Current production status can be investigated online.

MVS performance monitor from CPP

WITH MVS emerging as IBM's only large-scale operating system for the future, Computer Program Products has launched its first package specifically designed for total MVS performance monitoring.

The system is called CMF (Comprehensive Management Facility) and originates, like much of CAP-PP's performance-oriented software, from Boole and Babbage in the US.

Described as a family of products, CMF consists of a central or "master" monitor which controls a number of "submonitors." The latter performs most of the detailed analysis tasks

and may be switched on or off as required.

The master monitor enables these separate results to be correlated, so that a total picture of the system can be obtained. It is also responsible for activating the submonitors, either at regular sampling intervals or when particular events occur — for example, excessive TSO response time or a high paging rate.

Because of this architecture, CMF is said to incur the minimum possible operational overhead while facilitating a top-down approach to problem investigation.

Data collected by the system is available to the user in a number of forms, including real time online displays. The package also has a graphics facility, enabling plots, pie charts and Kiviat graphs to be produced on a line printer.

CMF is being offered on an

exchange basis to existing SMS/CUE users, costing £3,000 before May 1, and £5,665 thereafter. For new users, the corresponding prices are £10,665 and £13,330.

The equivalent IBM facility, RMF II, costs around £190 per month per CPU. CMF, argues CPP, offers significant advantages over the IBM product and is competitively priced.

Reports say that the system will support six terminals on a 128K Model D processor, and up to 16 on a 256K Series 1. Designed for both educational and commercial use, the language will include structured programming commands and a variety of diagnostics, and will be accompanied by an editing

system. Last year, Gulf Computing Systems of Kuwait acquired worldwide rights outside the US to the only other Series 1 Basic interpreter extant (Software File, July 6, 1978). This system, Basic/1, is still sold within the US by Data Systems Inc, of Denver, Colorado.

Two BCS meetings for Cobol specialists

THE BCS Cobol specialist group is holding two meetings this month which promise to be of exceptional interest.

On Wednesday, March 21, Kit Grindley will talk on Systematics, a systems analysis tool for system definition. He will describe a new program generator that creates Cobol programs directly from Systematics forms. The meeting is scheduled for 2.15 at the Polytechnic of Central London.

On the following Wednesday, March 28, Computer Weekly's regular columnist Tom Gibb is to talk on Design by Objectives. An overview of new tools for top-down system and program design, his insights are likely to be of major interest not only to Cobol programmers but to analysts and programmers working in any language.

This meeting will be held at 2.15 in Clarke Hall, Institute of Education, Bedford Way, London WC1. Admission will be by ticket obtainable at £1 from Derek Shuttlewood, Computer Dept, Sun Alliance & London, Sun Alliance House, North St, Hove, Sussex, BN1 1AB.

Alternative Basic from Waterloo

A SECOND Basic interpreter has been developed for IBM's Series 1 minicomputer. Written by the University of Waterloo, Ontario, the software is said to run under the RPS operating system, occupying about 80K bytes of memory. It will be available in the US around April or May.

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OP SPOT

Government chaos after ops' withdrawal of labour

ANY person who needed convincing of the importance of operations staff, both within the computer industry and on a national level, must have been swayed by the civil servants' strike last week, which paralysed vital government computer centres (CW, March 1).

Air your views

OPERATORS often complain that nobody listens to their point of view. Well, Op Spot is listening and Bernard Allen would like to hear your opinions and ideas on all matters relating to computer operations. Your letters should be sent to Op Spot, Computer Weekly, Dorset House, Stamford Street, London SE1 9LU. Telephone calls are equally welcome and Bernard can be contacted directly on 01-261 8035.

Pushing pay claims for their 330,000 joint membership, the Society of Civil and Public Servants' Association, withdrew about 1,300 staff from selected centres.

The action, which the union said would remain in effect until the government met their claims, immediately halted the flow of large amounts of government revenue at sites such as the Customs and Excise centre in Southend and the Ministry of Agriculture centre in Guildford.

While programming and systems staff played important roles in the action, the immediate damage was inflicted by the relatively few operators involved.

That fact highlights two vital issues: operations staff play a critical role not only within the

computer industry but on a broader level also; and the fact that few persons are needed to run a computer system also means that only a few have to withdraw their labour to cause chaos.

At the Southend centre, for example, 80 of the 142 staff taken out by the union were operators. That disrupted the collection of VAT revenue, worth £500 million per week, the repayment of VAT to traders, worth £100 million, and the compilation of trade statistics.

Action at the Ministry of Agriculture in Guildford halted the payment of grants and subsidies to farmers — about £6 million is involved every week — and stopped the production of statistics needed by the EEC for reimbursements to Britain worth between £200 million and £300 million per year.

Action by operations staff at the Ministry of Defence centre in Chorley disrupted the maintenance of accounts, payments to government contractors and production control in ordnance factories.

Donn Parker, computer fraud expert at Stanford Research Institute in the US, once remarked that programmers are the most dangerous people in the computer field. I suggest that he is wrong.

Back from Iran

RECENTLY returned from strife-torn Iran is Grenville Mills, formerly operations manager at the Tehran site of Iran Air. An interview with Mills, concerning technical rather than political issues, will appear in Op Spot soon.

By Bernard Allen



COMPUTER personnel agency Effettia Gravis has introduced a monthly competition intended to reward its established contract staff and attract new clients. First winner in contract operator is Chaeeman (right), who is receiving his prize, a £100 Thomas Cook travel voucher, from Mike Hampton, a spokesman.

Define your terms when changing jobs

BEFORE accepting a position with a company, an operator should take the trouble to find out the exact details of the terms of employment being offered.

It is vital that he learns everything about the number of staff he will work with and the person to whom he will report, facilities and conditions at the installation, and, most importantly, salary and grading reviews.

All this is very important. And I stress the matter after hearing of a disturbing case of an operator who lost his job as a result of a lack of awareness.

Although it was not mentioned at his interview, the company expected the operator to work alone in the computer room at all times. And the company assumed that he would complete evening shifts without a single break away from the machine room.

It was all a bit too much for the unfortunate operator. After a short while he complained to the site management and, following talks with his union representative, a hot-plate was provided so that the operators could cook food in the computer room.

In the meantime, the union had been involved in pay negotiations with the company on behalf of its members. They eventually agreed terms and, along with all other employees, the operator's salary was increased.

However, shortly afterwards, the increment was deducted from his pay. He was informed by the management that the company had anticipated the union claims and that the rise had been added to his salary at the time he joined the company. Soon afterwards, he was called into a meeting with management, informed that the company considered him unsuitable for employment — he had been on probation — and was given an ultimatum: resign or be sacked.

He chose to resign because he feared that a sacking would look bad on his employment record and make it difficult for him to find a position elsewhere.

The operator did not ask for

his union representative to attend the meeting because he had no idea that he was being dismissed by the company. As he had been at the company for less than 26 weeks, he had no right to appeal to an industrial tribunal for unfair dismissal. A solicitor later informed him that he could sue the company to court and win, but that it would be very expensive and that he didn't have a strong case, anyway.

Now some might consider that the operator caused or least contributed to his downfall by questioning the running of the installation soon as he started to work. Further, that having got into a difficult situation, he should have refused to resign and called in his union representative immediately.

I would disagree with the first point. In my view, the operators allow managers to dictate to them. To me, the operator to work alone without a break is a sick joke.

In part, I agree with the second point, although it is a bit in judgment after the fact and we don't know what the future was put on him.

But, in my view, the real issue is that at many sites there is a lack of standards in relation to the operations department. In past Op Spots I have stressed the need for operators to stand up for themselves. In interviews it is important to set out just what the company is offering, and to accept or decline accordingly.

Remember, the interview provides an opportunity to find out about the company and, in particular, the operations department. Use it to learn as much as you can, including the following:

- 1 — Salary, and how often reviewed;
- 2 — Grading reviews;
- 3 — Facilities and conditions at the site;
- 4 — The number of staff you will work with, and the person to whom you will report to.

By finding out in advance, you can save yourself a lot of biets later on.

HINT OF THE WEEK

Look after punch cards

LAST week in Op Spot we had a hint relating to punched output in the IBM OS environment. And this week I would like, briefly, to consider the use of punch cards in general.

If stored in damp conditions, they sometimes become bowed, or warped, and so present the operator with a number of troubles, if not insurmountable, little problems.

Such cards tend to get caught up in the workings of punch units, particularly the older, more mechanical devices. And when this happens, the operator has to open up the unit and clear the error.

In addition, they often cause

feed stops and other problems. Each time you have a problem, they are in a position where they can be replaced by a new card, which is supplied by the manufacturer. The unit will then feed in the new card and the problem is solved. This is a very simple and effective way of dealing with the problem. It is a good idea to have a spare set of punch cards on hand, just in case you need them. This will save you a lot of time and trouble in the long run.

Victory for doctors on confidentiality

DOCTORS have gained a victory in their efforts to have a say in the confidentiality of the proposed Child Health Computer System (CW, August 3 and May 4 1978).

At a meeting between the British Medical Association and Sir Henry Yellowlees, chief medical officer at the DHSS, it was agreed that no proposals for further development would go ahead without consultation with the BMA and the Joint Consultants' Committee.

The DHSS also agreed that none of the pilot schemes that had been planned would go ahead at present.

Yellowlees took away from the meeting a list of questions about security of this type of computer system, that had been drawn up by the BMA with

the help of computer experts, and he has promised to reply to them all.

The BMA Ethics Committee has for some time been protesting that adequate provisions for safeguarding patients' confidentiality had been included in plans for the "Standard Child Health System, Pre-school Module", which would store centrally medical information about all children up to the age of five in England and Wales.

The association is "delighted" with the results of the meeting, according to a spokesman. There were particular worries about the pilot schemes, which would have experimented with confidential details of "real live people", she said.

The Joint Consultants' Committee comprises representatives of the BMA and the Royal College of Physicians and Surgeons.

Advt of year award

ORGANISERS of the "Computer advertisement of the year award" have extended the closing date for entries to March 31, to cater for the large amount of last minute material. The 20 entries expected will be judged by a panel which includes Computer Weekly editor Gareth Jones. Prizes for the competition include trophies and a set computer.

Each entry should be mounted on stiff card and accompanied by a cheque for £10 payable to the BCS Specialist Group for the disabled, to which all the proceeds are to be given. Entry forms are available from Beverley Dellow, Couchman Ltd, 42 Great Windmill Street, London W1V 7PA, Tel 01-437 4187.

Intel may launch 'megabubble' memory

FOLLOWING the formation of a division aimed at developing bubble memory products (CW, November 3, 1977), Intel has remained secretive about what and when its first product entry in this field might be. US sources, however, now indicate that the division, Intel Magnetics, is about to launch the biggest bubble memory device yet made, and that it may be introduced as a part of a new computer system from the company.

Intel Magnetics is rumoured to be introducing a one Megabit memory this spring. The device is thought to make use of 2.4 micron diameter bubbles, which compares with the 2.7 micron diameter used by Texas Instruments. TI, like Rockwell, currently has available a 256K bit memory.

The sources also indicate that Intel will follow the trend set by Texas Instruments when it first entered the bubble memory market. TI launched its memory on the back of a concurrent systems introduction and Intel may do the same.

Report surveys the European mini scene

A REPORT* from IDC Europe on the European minicomputer business, published this month, says that in 1977, Hewlett-Packard was number one minicomputer by value in Western Europe, with business worth \$150 million. Long the leader, Digital Equipment Corp fell to second place with \$135 million in sales, while Data General was third with \$90 million and Sie-

mens fourth with \$31 million. The report, which has not been made available for review although it can be examined at the company's offices, also includes figures for number of systems shipped. However, as DEC alone has products ranging from the PDP-11/70 down to the LSI-11/2 such figures reveal little. It can be inferred that since Data General has the

highest level by volume, the Nova 3 did well at the expense of the PDP-11/34, for which DEC was having to quote deliveries in excess of one year for a period. The summary of the report provided by IDC notes that the four UK minicomputer firms, GEC, CIL, and Digico, have 21% of the UK installed base by number, and presumably also at least as high a percentage by

value, since all but Digico are primarily in the high value end of the market.

The figures, which refer to 1977, fail to reflect the benefits gained by Honeywell as a result of its Level 8 minicomputer line, which appears to have really begun to take off in 1978.

* Minicomputer Marketplace — Western Europe 1977-1982, L1-350. IDC Europe, 21st Floor, London W1 1LT. Tel 01-935 9222.

Braille printer from Norsk

A BRAILLE printer and typesetting software, which enable editions for the blind of run-of-the-mill books to be produced cheaply, have been devised by the Norwegian Research Institute and Norsk Data. The production model of the printer, when it comes on the market, will produce Braille on paper, both sides, at a rate of 230 characters per second.

The machine will also emboss the Braille on metal plates from which multiple copies can be made. Since the driving software is an adaptation of Norsk Data's standard typesetting software, and many books are now printed using computer setting, it is practical at the end of a run of, say, a schoolbook to produce a few copies for blind children. This saves the formidable extra cost of rekeyboarding.

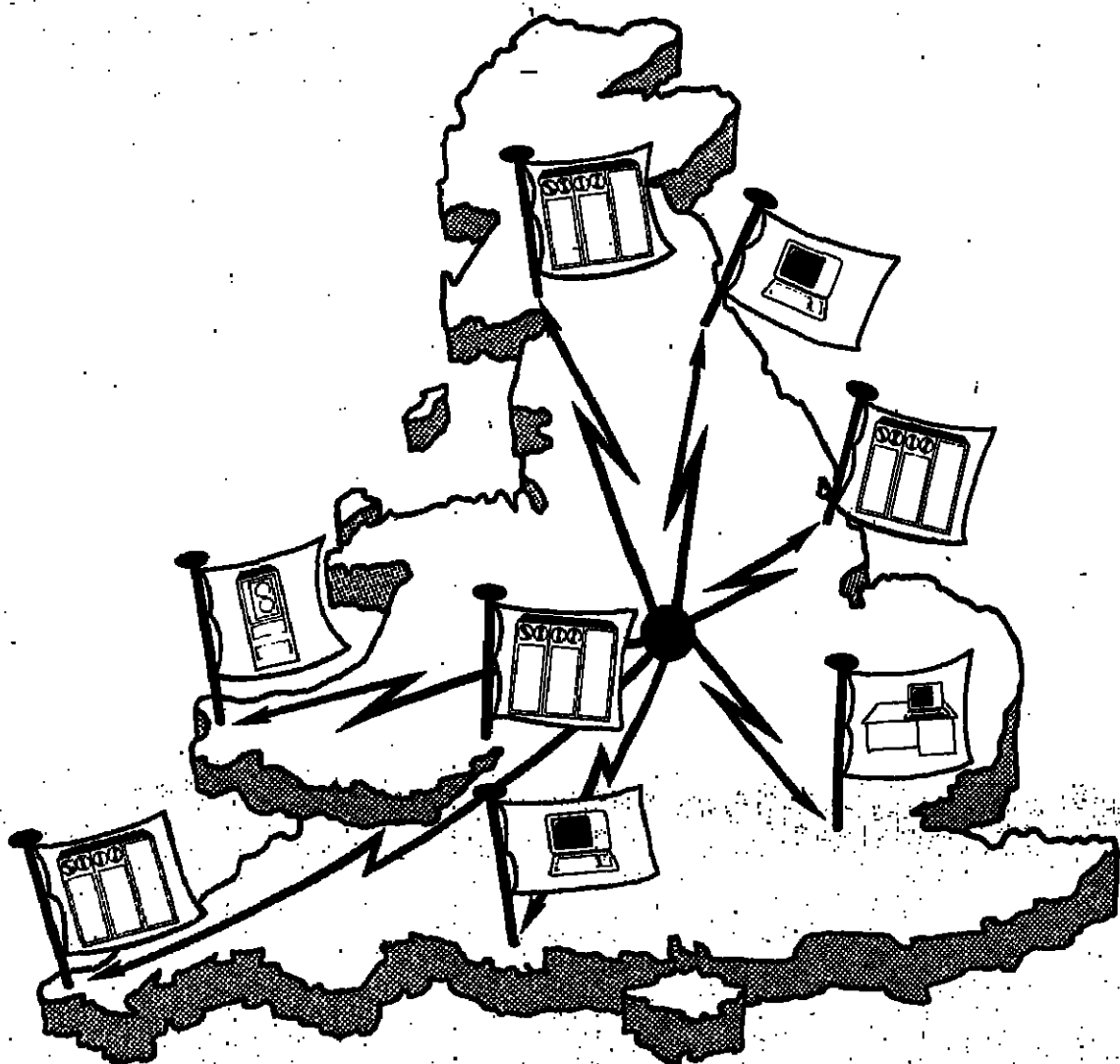
If corrections need to be made to the Braille text, it can be displaced (as Braille patterns) on a VDU before the embossing takes place. Formerly corrections could only be made on the metal plates, by hammering, a cumbersome process.



Course for Kuwait students

TAKING advantage of the burgeoning interest in data processing in the Middle East, the National Coal Board's computer services subsidiary, Compower, has won a contract from the Kuwait Ministry of Planning to provide a specially tailored 28-week course for 11 people from the Ministry. The course is being held at Compower's residential training centre at Cannock, Staffs, and some of the students from Kuwait are seen here with Compower's head of training, Brian Dunning (second from right), who negotiated the contract when he last made a sales trip to the Middle East last September. Next month Dunning plans to visit Abu Dhabi, Iraq, Libya and Saudi Arabia.

CMC SOVEREIGN knows how to communicate



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being received from the computer centre. Powerful software will enable SOVEREIGN's Processing Terminals to emulate a variety of batch and transaction terminals within such a network.

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Head Office and Manufacturing: Maxted Close, Hemet Hempstead, Herts HP2 7LA. Telephone 0442 61266.

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PDP-11 family. This can be a tremendous advantage if your programmers are used to the PDP-11 family — even though the machine is so much bigger and more powerful it's still like sliding down with an old, familiar friend.

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PEOPLE AND EVENTS

Key jobs at Honeywell

A NUMBER of key marketing appointments have been announced by Honeywell Information Systems, based at the company's minicomputer and terminals division in Hemel Hempstead. Colin Kindred will continue as manager of national minicomputer sales, with responsibility for Level 6 sales. Appointed sales manager of the government and public sector is Ronald Needham, who has gained experience of dealing with government computing agencies through his former position of sales director for Computer Sciences International.

Robert Henderson, who has recently returned from Honeywell Italy, has taken the position of export marketing manager, and James Beard joins the UK marketing team as marketing manager for distributed systems sold through Honeywell's Data Processing and General Systems Divisions. His previous assignments include national sales manager for Raytheon Corp in the US.

Manager of marketing operations for Level 6 product marketing, software planning and promotions, is David Norton. He was formerly Honeywell's marketing support manager for minicomputers.



David Constable has joined Infocore's UK sales operation as sales executive. He was formerly a salesman with Syntex, and before that with Rediffon Computers. Senior systems engineer for the Infocore Midlands region is John Lee, previously systems consultant with Rediffon. A former sales executive with CDC, Geoff Garside has been appointed senior sales representative in the South West.

David Pearson, formerly projects manager with Sys-Com (Computers), has been appointed to the board of the company as production director. Before joining Sys-Com, he was a systems manager with Singer Business Machines.

AS part of their technical study tour of Europe, a group of Brazilian students recently included a visit to the Wythenshawe division of Ferranti Computer Systems. The 10 visitors are all first year electronics students at the Instituto Tecnológico Aeronáutico in São Paulo, Brazil; and the UK part of their

tour has been arranged by the Institute of Directors. During their visit to Wythenshawe, the students were told about Ferranti's worldwide involvement, in particular that with Cobas, Brazil's first computer company. Our picture shows the students with Ferranti staff at one of various project assembly areas.

Bryan Churcher, marketing manager of P-E Computer Services, has been appointed to the company's board as director responsible of market strategy.

Roger Kaye has become general manager of Energy Communica-

tions, the Aberdeen based telecommunications company. He succeeds Ian Rumbles, who will be transferred by the parent company IAL, to Nairobi as managing director of IAL's associated company (IAEA) Ltd. Kaye was formerly engineering manager with ECL, and his previous

experience includes the installation of the Camber coaxial cable in Bermuda, while he was employed by Cable and Wireless.

Richard Coe has become senior systems analyst for the South-West branch of Rediffon Computers. He was formerly computer manager with MailMarketing Systems and

lately for the South-East Branch is Steve Humble, who before joining Rediffon was a systems analyst with Lyons Bakery of Barnsley.

Orlando Tonini has been named acting international sales manager for Randel Data Systems. He was formerly president of Minicom of Northern Michigan, and has been a Randel distributor for the past four years.

David Reed has become a territory manager for Computer Machinery Company. He will be based at CMC's Bristol office and will be responsible for sales in Gloucestershire and several companies in the West Country. Reed joins CMC from ICL where he was account manager, and prior to that he was with Burroughs.

Clive Lambie has joined Sypher Designs (Electronics) as director of the development of software engineering. He was formerly employed by the Stock Exchange where he was a senior systems engineer, and played an important role in the implementation of the Stock Exchange's nationwide real time data networks.

John Langman has been appointed distribution sales manager for Advanced Micro Devices (UK). He was previously sales and product manager at Jernym Industries.

Sir Robert Clarke, chief executive and deputy chairman of the ILLI Samuel Group, has become chairman of Lowndes-John Computer Service.

By Judith Morris

Top DP man of the year

THE search is on for the Data Processing Manager of the Year. IDPM and Data Update give their yearly award to the manager who, in the judges' opinion, has most successfully achieved budgetary targets and agreed implementation schedules, and used systems most effectively and economically. All UK-based DP managers are eligible for the award, and the winner will receive £250 and a personal trophy. Details from Poly Bridge, 27 Lodge Road, Hammersley, London NW4, Tel 01-203 3103.

Richard Trevelyan has joined Rediffon Computers as territory manager for the Northern branch. He was previously self-employed as an independent consultant on computer systems. Territory manager for the Midlands branch of the company is Frank Johnson, who formerly worked as a sales executive for Comshare.

Charles Zwingman has been appointed to the position of director of corporate director of industrial relations of Penril Corp. He was formerly with CSC's Systems Group based in Falls Church, Virginia, a director of industrial relations.



Jim Shaw has been appointed technical manager for Cerebral Data Systems. He was formerly technical development manager of the Mars group in the UK, where he was responsible for all systems design and programming functions.

Chris Ibbett, operations director of System Industries (Europe) Ltd in Woking, has become international marketing director in the UK for company System Industries Inc. His new position he will be based in Sunnyvale, California, and will be responsible for co-ordinating marketing and engineering activities.

DIARY

MARCH 10 Final of schools management game. BCS Halfast branch, Independent Computer Services, Queens Road, Belfast. Closed event.

MARCH 11 Mathematics in telecommunications, F. M. Clayton. IEE Telecommunications networks and systems group, Savoy Place, London WC2.

People and computers in project management. One day seminar. Association of project managers, Waldorf Hotel, London WC2. Details APM, 01-799 3182.

Word processing. B. Gifford. BCS Croydon branch, Fairfield Halls, Croydon. 18.15.

DIY, BCS, Reading branch, Copper Inn, Pangbourne. 20.00.

Automatic programming languages, J. Cockley. R. Weaver. BCS Harlow sub-branch, Harlow Technical College, Harlow. 18.30.

Electronics and the industrial strategy. M. Clarke. IEE London Graduate and Student section, King's College, Strand, London WC2. Details J. F. Armstrong, 8 The Mount, Puckeridge, Herts.

MARCH 14 Displays in television. BCS Displays group, City University, London. 14.00. Details 0453-31281 ext 264.

Robotics for engineers, MechB, I Birdcage Walk, London SW1. Registration required. Tel 0294 63277, ext. 68.

Mathematics, physics and perplexed youth. Prof G. Matthews. IMA/Institute of Physics, Natural History Museum, Cromwell Road, London SW7 5DB.

MARCH 15 Cashless society, J. M. Williams, BCS London branch, Waldorf Hotel, London WC2. 18.00.

Project management symposium. BCS Coventry branch, Lanchester Polytechnic. 18.30.

MARCH 16 Cashless society, J. M. Williams, BCS London branch, Waldorf Hotel, London WC2. 18.00.

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MARCH 17 IBM - the next five years. Infotech State of the Art conference. Hotel Sofitel, Paris. Contact Dave Bates: 0628 80051.

MARCH 20 Logic for databases and programs. R. Kowalski. BCS Formal Aspects of Computing Science Group, Polytechnic of Central London, London WC2.

Recent developments in point of sales terminals. IEE/IERE Computer group, Royal Institution, Albemarle Street, London W1. 18.00.

MARCH 21 Microprocessors - from the west point of view. Dr E. Q. Aitken. IETI Luton branch, Luton Polytechnic, Luton. 18.30.

MARCH 22 Practical privacy. Tel City, 1994 Central London branch, Paul and Dan Studio, Broadwick House, Broadwick Street, London W1. 18.00.

Mechanical handling and control of mail. P. J. O'Doherty. IETI, Education Centre, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200.

MARCH 23 The influence of computer on teaching of electronics. IEE/IERE Computer group, Royal Institution, Albemarle Street, London W1. 18.00.

MARCH 24 Funding of microprocessors. BCS Microprocessor group, Polytechnic of Central London, London WC2. 18.30.

MARCH 25 DVLC, a second look. IEE/IERE Computer group, Royal Institution, Albemarle Street, London W1. 18.00.

MARCH 26 European Computing Network. The European Computer Network. Contact Dave Bates: 0628 80051.

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Data Dynamics Group

MICRO NEWS

ONCE a year, the semiconductor industry comes together to talk about some of the latest developments in products and technology and about some of the wider problem areas that face them, at an event known as the International Solid State Circuits Conference. Micro News presents the first of a series of reports on the papers and panel sessions.

Software is main progress barrier

THOUGH the temperatures outside the Philadelphia Sheraton rarely struggled above 20°F, the discussions within at the 28th International Solid State Circuits Conference often related the temperatures, particularly some of the evening panels.

While the main sessions of the conference covered the expanding capabilities of semiconductor technology, the evening sessions broadened the scope considerably.

In particular, the session on third generation high end microprocessors brought into the forefront the importance of software in the systems environments their products are now being designed into.

The panel members represented a cross-section of the business, ranging from the merchant suppliers such as Intel, Motorola and Zilog, to the systems companies within in-house manufacturing facilities, represented by Digital Equipment and Hewlett-Packard.

From Motorola, microcomputer design manager, Gary Daniels suggested that the main problem facing the introduction of microcomputer systems was software.

Secondary to this were the difficulties of testing the devices, developing the computer-aided design systems to actually produce them, and finding the necessary capital for production.

The problems of software for micros were perhaps better understood by the systems-oriented companies, according to Duane Dickhut of Digital Equipment. This was particularly true where existing architectures were in use that could be used in lower power systems and equipment.

DEC, he said, manufactured semiconductors solely to provide the building blocks the company requires, which is why it prefers the microprogrammable approach.

This philosophy was backed up by Larry Lopp of Hewlett-Packard, a company that has made a concerted thrust in semiconductor vertical integration as part of its systems activities.

To this, however, Lopp added a problem facing many systems houses, and one that is a neat juxtaposition to the view put forward by Intel chairman Gordon Moore in his keynote address to the conference (CW, February 22).

Lopp suggested that the systems house challenge was also economic, stating that HP for example, while able to define the devices it required, was not big enough to have the economies of scale necessary to produce the parts.

This would especially be the case with VLSI devices, he said, where the design processes were long, tedious and expensive.

Dickhut indicated that DEC might be making a single chip version of its LSI-11 system. He indicated that things are well under way in advanced research, but this did not mean the company might soon be entering the merchant market.

Analogue chip rouses interest

WHAT has already been christened by one Intel executive as the 4004 of a whole new generation of microprocessors officially saw the light of day at Philadelphia. This was the company's 2920 analogue microprocessor.

Its announcement in the conference programme caused more than a ripple of interest, prompting Wall Street analyst

Benjamin Rosen, of Morgan Stanley, to hail it as potentially the product of the year (CW, January 4).

The reality is, perhaps, a little less startling than the initial impressions might have indicated. For the device is still very much digital at heart. There has been no fundamental breakthrough in processing data in an analogue fashion.

With the 2920, Intel has basically extended the ideas put into practice with the 8022, 8-bit microcomputer. This has an on-chip A-D converter input capability. To this, the company has also now added a D-A converter output stage.

The major market segment seen by Intel for the new part is in signal processing, and it is obviously looking to the rapid potential growth in communications activities to give it a strong sales base.

Due to be sampled during the second or third quarters of this year, the 2920 as described at the conference incorporates on-chip A-D, D-A conversion, 192-bit word EPROM, a scratch pad RAM, an arithmetic unit, I/O, sample and hold circuits.

The architecture of the device is oriented towards real time processing of digitised samples of analogue inputs, making it suitable as a variety of communications signal processing sub-systems, such as modems, multifrequency tone receivers and process controllers.

For each application, the chip can be customised by programming the EPROM, which controls the operation of both the A-D and D-A portions of the device, and the digital processor.

The panel agreed that the really big markets for microprocessors had not yet been found nor defined.

Carver Mead of the Californian Institute of Technology, felt the key was greater standardisation of communications protocols, even among chip families. Others felt that software standardisation was more important.

For example, it was suggested that the economics of semiconductor production would not support the introduction of innovative architectures, as there would be insufficient volume to make it worthwhile. Also the users want Cobol and Fortran-oriented architectures, as anything different implies the use of a new language, which users are reluctant to adopt.

'No changes' to Motorola's 68000

THE suggestion put forward recently by Intel's Data House that the Motorola 68000 16-bit microprocessor would be undergoing a reduction in its planned specification has been firmly denied by Gary Daniels, Motorola's microcomputer design manager.

Speaking at the recent International Solid State Circuits Conference in Philadelphia, he said that no changes to the specification of the part have been made, or were planned.

Hence, who is microcomputer marketing manager, also suggested that the Motorola part would be very large, and therefore would be a difficult device to manufacture (CW, February 18).

To some extent, this was confirmed by Daniels, who stated that the first version of the processor

would certainly be greater than 250 mils per side, but under 300 mils.

This will give a chip area of between 62,500 and 90,000 square mils, making production yields critical for the company, and making the part very expensive initially.

Daniels went on to claim that the 68000 processor would rapidly track the size reductions now being achieved with Motorola's 6800 family, and that within three years, standard photolithographic techniques will have brought the chip area down to about 25,000 square mils.

First silicon on the 68000 is expected by the middle of this year.

RCA launches cross-assembler

A CROSS-ASSEMBLER has been developed by RCA Solid State to enable users of the Intel MDS prototyping system to develop software for the RCA CDP1802 microprocessor.

Consisting of a macro file designed to run in conjunction with the Intel 8080/8085 macro assembler, the software allows the user to write a program in 1802 mnemonics. An MDS command is then used to generate a suitable macro-file, which is assembled in the normal way to produce 1802 machine code.

Subsequently, either an Intel EPRM programmer or the RCA transcoding program can be used for program loading.

Matra, Harris link-up

THE talks on collaboration between Matra of France and Harris Semiconductors (CW, October 26, 1978) have at last come to fruition, with the signing of an agreement in principle to form a joint venture company based in the Nantes region of France.

Matra will be making an investment of about £5.5 million, and will hold 81% of the equity in the new company, to be called Matra-Harris. The balance of the investment required will be coming from the French Government, with a contribution of about £14 million.

Harris will gain 49% of the equity, but its only investment will be in the provision of technology. This is likely to centre around Harris' self-aligned, junction-isolated CMOS technology, which can operate at up to 40 MHz.

BITS 'n' PIECES

Aggressively priced printer

A UK designed printer that has very aggressive pricing for the features offered has been introduced by J. A. Walters, a High Wycombe-based manufacturer. Named the Dolphin BD80, marketing is initially being carried out by Dialogue Marketing of Marlow.

With a unit price of £575, it is an 80 column line printer offering the full ASCII 88 character set. It accepts standard 9.5 inch continuous roll-fed stationery, which can be printed in a 10 character per inch six line per inch format. A

400 character buffer is also included.

Mostek 3870 updated

MOSTEK has introduced a new version of its 3870, 8-bit microcomputer that incorporates a new Double-Dip packaging concept that allows the package of up to 4K bytes of PROM.

The technique gives a new meaning to the phrase "chip on-board PROM", for the package for the new micro, called the 3874, carries the PROM on its back.

A standard 24-pin DIP package is plugged into a socket built in to the top of the micro package and, depending on the device chosen, allows the user to emulate one, or a number of the other members of the family of microcomputers.

Memory boards

A COMPLETE RANGE of memory boards for all Digital Equipment LSI-11 based computers is now held by Data Dynamics. The boards are based on the PDP-11/15 and PDP-11/20 systems, for which the most popular boards are 16K, 32K, 64K, 128K, 256K, 512K, 1024K, 2048K, 4096K, 8192K, 16384K, 32768K, 65536K, 131072K, 262144K, 524288K, 1048576K, 2097152K, 4194304K, 8388608K, 16777216K, 33554432K, 67108864K, 134217728K, 268435456K, 536870912K, 1073741824K, 2147483648K, 4294967296K, 8589934592K, 17179869184K, 34359738368K, 68719476736K, 137438953472K, 274877906944K, 549755813888K, 1099511627776K, 2199023255552K, 4398046511104K, 8796093022208K, 17592186044416K, 35184372088832K, 70368744177664K, 140737488355328K, 281474976710656K, 562949953421312K, 1125899906842624K, 2251799813685248K, 4503599627370496K, 9007199254740992K, 18014398509481984K, 36028797018963968K, 72057594037927936K, 144115188075855872K, 288230376151711744K, 576460752303423488K, 1152921504606846976K, 2305843009213693952K, 4611686018427387904K, 9223372036854775808K, 18446744073709551616K, 36893488147419103232K, 73786976294838206464K, 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As online systems grow, so also does the commitment to network reliability. In the US, data processing managers find that one of the most useful tools for minimising system downtime is the

"tech control centre" which serves as a focal point for monitoring the network, diagnosing problems, isolating faulty lines and equipment and restoring the service with minimal delay.

MORRIS EDWARDS (right) gives some hints on setting up a centre, and describes some of the latest tech control equipment on the market, comparing their ways of working.



'Tech control' key to network reliability

ONLY a few years ago, the task of putting together a tech control centre was a major undertaking, since the bulk of the equipment had to be tailored to the user's specific requirements.

Today, the centre can be quickly implemented out of standardised patch, switch and monitor modules at little cost per channel.

What is more, the modular systems allow users to expand the centre in pace with the network's growth. Typically, switch modules connect in series between a single modem and two terminals, say. With this arrangement, the modem may be switched to either its primary terminal or the back-up simply by flipping a front-panel switch. Similarly, fail-back switching can be provided for primary and standby modems or dual front-end processors.

Patch and monitor modules also connect in series between the terminal and modem, and the modem and communications line.

For monitoring or testing purposes, the patch module is switched to a patch mode, which breaks the connection between the modem and terminal or modem and line, so that the test set can be patched into the link.

In this way, the test set can replace the terminal, say, and can send a pattern into the modem for transmission over the data link.

This test pattern may be looped back at any convenient point in the link; by changing the loopback point, successive tests can be performed to pinpoint the location of the faulty unit.

Much of the development work in these centres now focuses on providing central site management of multipoint networks.

Central site control is needed in such networks because a lot of locations do not have the trained technical staff required to perform the diagnostic procedures and to rectify faulty conditions. Also, whereas isolating network problems is more complex and time-consuming with multipoint configurations, speedy restoration of network operations is critical since multipoint networks are commonly used in banking, reservations and similar real time applications.

Further, whereas the failure of one terminal, modem or line in a point-to-point network only disrupts service to one remote facility, a similar failure in a multipoint network halts communications with all remote network points behind it.

To provide the central site's diagnostic capability, modem vendors make use of a secondary, or "out-of-band", channel to carry the monitoring and test signals. With a standard voice-grade telephone line, the channel frequency spectrum runs from about 300 Hz to 3.3 kHz. Since a 4,800 bps modem typically employs a bandwidth of about 1,800 Hz spread around the centre frequency, there is ample spectrum at the high and low end to take a secondary channel.

By transmitting the diagnostic signals at the same time as data, and over the same link, users can monitor and troubleshoot without disrupting network operations.

To handle diagnostics throughout the network, the central site employs a master controller that communicates with the remote modems over the secondary channel.

Each modem has a unique address so it may be individually interrogated by the control-

ler. Addresses and commands are generally entered into the controller via either a keyboard or switches. A display shows the results of tests or monitoring sequences.

Through the controller, users have the capability to: 1. Monitor the status of remote units; 2. Diagnose a network problem and isolate the faulty unit; and, 3. Restore network operation while the failed element is being repaired or replaced.

Monitoring may be continuous or selective. In the former mode, the controller polls each remote site over and over to check for modem streaming, to determine the status of the modem's signal quality leads or selected interface leads, to confirm line continuity or to verify whether power is on or off.

When the controller detects abnormal conditions, it sounds an alarm and displays or prints a report on the fault.

In selective monitoring, the user identifies certain locations that are suspect, and these are checked out repeatedly. Also, selective tests can be conducted once a fault has been isolated by continuous monitoring or by other diagnostic procedures.

Diagnostics begin with such standard point-to-point procedures as modem self-test and analogue and digital loopback tests.

The sequence starts with a check on the central site equipment. Next, the operator addresses the remote modem and switches it to self-test mode, checking the status of signal indicators and the error count.

If the modems are functioning properly, the operator checks the line with an analogue loopback test, which returns the outbound test pattern back to the central site without going through the digital portion of the remote modem.

In this test, a high error count shows the line is faulty. With the digital loopback test, the test pattern goes through the digital circuits of the remote modem before looping back to the central site, identifying any faults in the modem.

By following this sequence, the operator can isolate the cause of a network problem through a process of elimination to either a line or particular modem. If the lines and modems show no faults, the next step is a polling test to see if the problem lies in the dynamic functioning of network components.

polling in multipoint networks calls for rapid modem equalisation and start of transmission each time a station is polled. A polling test checks whether the station can make the change from idle to operational status without generating too many errors.

For this test, the controller sends the test pattern over the main data channel.

At the remote modem, the received bit stream is compared against the test pattern already stored there, and the error count determined. This count is transmitted back to the controller, along with another test pattern, which is checked for errors at the central site.

By examining the error counts for the outbound and inbound links, the operator can quickly gauge the network's dynamic performance.

Restoral functions generally include dial back-up, spare modem switching and speed reduction without the intervention of remote site personnel.

To disconnect a malfunctioning modem or terminal, the controller sends a command to disable the modem's data channel transmitter.

In this way, the secondary channel stays active so that monitoring, diagnostic and restoral activity can continue. When the problem is corrected, the controller enables the remote modem with a restoral command.

For dial back-up, full duplex

systems require two dialled connections and a line sharing device. This transmits outbound messages and detects incoming traffic on a contention basis.

Dialling may be manual or automatic. Critical remote sites may be equipped with "powered" spare modems, which the controller can switch into the network to take over from a malfunctioning unit.

Speed reduction refers to the ability of modems to function at a lower data rate to permit continued operation in the face of degraded line quality.

When line quality deteriorates to a threshold level, the control-

ler automatically switches all modems on a particular multipoint link to the lower data rate, restoring the system to the normal rate when the line quality improves.

Speed reduction often accompanies dial back-up operation, since the quality of dial-up lines is often well below that of leased facilities.

The pioneer of multipoint network control systems is Intelnet Inc, represented in the UK by Cossor Electronics. In 1973, Intelnet introduced the first integrated package of diagnostic gear, modems and remote control restoral hardware to place

multipoint control in the hands of a single central site operator. In 1976, it announced a "second generation" system, the NCS-4000 network control system, for handling online distributed processing systems.

Then, early last year, the firm unveiled a fully automated network control system, the ENE One, which adds automatic monitoring and scheduled, unattended testing capabilities to network control systems. Also, the new system can "query" the network automatically, learn its configuration and build a diag-

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A novel approach to multipoint network management

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without any operator intervention — a feature called "self learning."

In automatic monitoring mode, the EMS-One continuously polls all active lines and reports changes of status to the operator with both visual and audio alarms. The system maintains a list of all faults that remain uncorrected for the operator to view at his discretion.

Scheduled, unattended testing is accomplished in the automatic predictive maintenance mode, which allows the operator to initiate on- and off-line testing of any or all lines at specific times of day. Results are recorded by the console printer, allowing unattended operation during off-hours.

These hard copy records can be subsequently used as an indicator of trends in equipment performance for predictive failure analysis.

Another leader in network control is Codex, represented in

the UK by Cole Electronics, whose multipoint network control system comprises a central site master control console and remote card modules that insert in any of the firm's Fast-Poll series modems.

MNCS operates through a frequency division multiplexed FSK secondary channel to handle two main functions: isolate the malfunctioning network element, and restore network operation through alternative facilities. It can control up to eight separate multipoint lines, with up to 30 drops on each.

A keylock switch selects monitor, test or configuration change mode. Stringent error control is used with the latter two modes to prevent execution of false commands.

Unlike other network control systems that only work with the vendor's own modems, General DataComm's Netcon-5 operates with any multipoint network employing modems compatible with Bell 201, 202 or 208 types.

The system can address over

10,000 remote stations and automatically run a series of tests to determine station status without interfering with the network operation.

Continuous monitoring may be interrupted to perform specific on- or off-line tests. For distributed processing networks, a diagnostic subsystem permits multilevel addressing. General DataComm is represented in the UK by IAL Data Communications.

In a novel approach to multipoint network management, Paradyne Corp utilises the microprocessor in its latest multipoint modem to provide extensive diagnostic capabilities at each drop in the network.

Part of the microprocessor's function in the modem is to rapidly and accurately measure and analyse various transmission line impairments.

In its Analysis 1 system, the firm (represented by EMI Technology) uses a network interrogating procedure to automatically analyse this diagnostic data from every network drop

on a continuous and non-interfering basis.

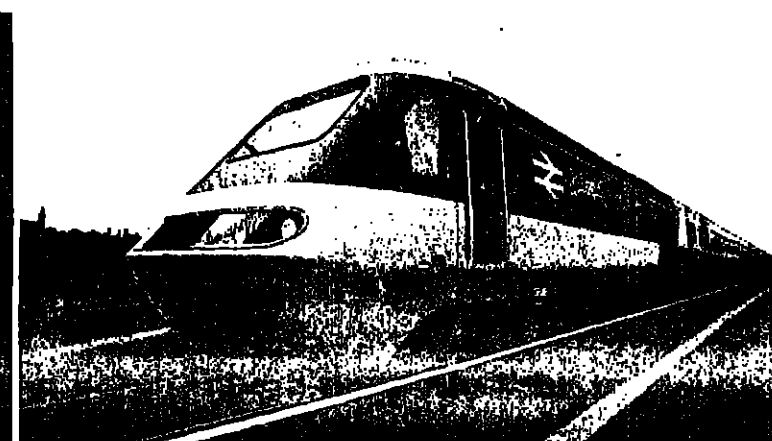
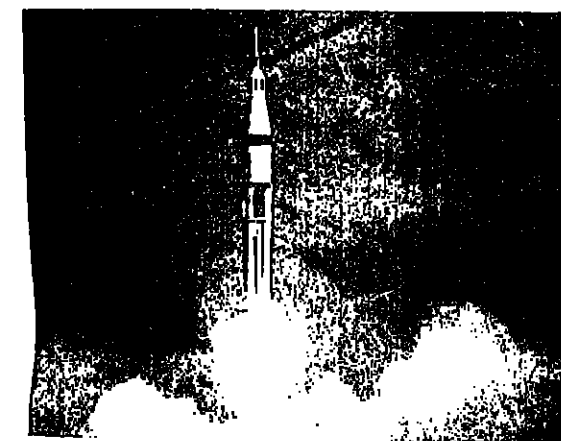
Numerous categories of data are received from each drop and are compared against predetermined acceptance criteria. All non-acceptable states are immediately displayed on the operator's console, along with recommended restoration procedures.

Having decided on a remedial action, the operator can then use the Analysis 1 system to implement the decision.

Racal-Milgo's System 180 network diagnostic controller can check out 16 lines, each with up to 254 stations. It uses a secondary 75 bps FSK channel to scan automatically and report station status without interrupting network operation. The firm offers a mass storage device for logging exception reports from remote sites. Also, to simplify testing, the console can display action commands in logical sequence to prompt the operator to follow system test guidelines in isolating a network problem.

VAX: "An implementor's dream."

Dr. Brian Ford, Director, Numerical Algorithms Group
Oxford, England/Downers Grove, Illinois



For the Numerical Algorithms Group, the plain fact is this: "Software implementation was faster on the VAX-11/780 than on 25 other major machines."

Before VAX, Dr. Ford's staff had implemented NAG's complex FORTRAN Mark 6 Library on 25 major machines ranging from minis to mainframes, including the Burroughs 6700, CDC7600, Univac 1100, and IBM 370. The average implementation time was 13 man-weeks.

VAX took five. In Dr. Ford's words: "The NAG FORTRAN Mark 6 Library consists of 345 subroutines covering the major areas of numerical mathematics and statistics. It's used in applications such as structural design, nuclear physics, economic modelling, and academic research."



"A successful implementation requires the correct functioning of the 345 library routines to a prescribed accuracy and efficiency in execution of NAG's suite of 620 test programs. Whilst the activity is a significant examination of a machine's conformity to the ANSI standard of the FORTRAN-compiler, its main technical

features are file creation, file comparison, file manipulation and file maintenance."

And then there was the record of VAX reliability: "No problems were encountered in the VAX/VMS software even though approximately 3000 files were being handled. The operational availability time for the machine was close to 100%, an outstanding statistic for new hardware and a new operating system."

What all this demonstrates is that some of the most sophisticated FORTRAN routines in the world implement easily on VAX. That VAX capability exceeds that of many machines far more expensive. That the VAX-11/780 is more than the most powerful 32-bit computer in its price range. That VAX is truly "an implementor's dream".

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MICROS AND JOBS CONFERENCE

Jenkins points to riddle of where work will be created



CLIVE JENKINS, general secretary of the white collar union ASTMS, told a one-day conference on Microprocessors and Jobs that there was considerable difficulty in assessing the areas for job gains, while it was possible to calculate potential job losses over the next 11 years.

Though many speakers at the conference, organised by Online, could pick their way through the multiplicity of ills currently facing UK industry and commerce as good reasons for the need to start using microelectronics, few offered the audience a consensus view of the type of direct action that might be needed.

This was exacerbated by the fact that a large percentage of the audience was drawn from within the DP industry itself — an industry that has lived with the concept of its own impact on society and for many years.

The potential for de-industrialisation in the UK via the activities of its competitors, is well-charted water in the micro debate, and the opportunities for unemployment — and attendant social unrest — are well known.

Jenkins pointed out that the number of unemployed was no longer directly tied to the economic performance of a nation. He pointed to West Germany with 1.1 million jobless even with reasonable economic growth. Current estimates pointed to a UK figure of about 4.5 million by 1990.

Ray Currow, of Sussex University's science policy research unit, agreed that there would be severe employment dislocation but suggested that the micro was not the fundamental cause of it. Rather, he suggested it was the state that broke the "cushion" back as structural unemployment was nothing new.

So how should the unemployed be coped with? Several of the union speakers stressed the need for much greater co-ordination and effort in manpower planning in companies.

John Lloyd of the electricians' union said that the biggest need was for good, long-term communications between employers and employees on new developments and potential job losses and changes.

He admitted that many unions were frightened by the potential of the micro, so working it out now would stop the inevitable social upheaval.

This view was supported by industrialist speakers as well. Geoffrey Souter, personnel director of ITC Consumer Products said that co-operation could solve many problems.

His own company, which has gone through several traumatic changes due to foreign competition, had found employing a full-time manager to look after the interests of staff and provide counselling services had been very beneficial. The real cure, though, was for the company to search continually for new product opportunities.

A favourite "sponge" touted to soak up the future unemployment was the service sector and

is planned for delivery to Baddeley Colliery in July and will track each coal seam by means of special detectors.

radiation sensors to pick up the ambient rock radiation in strata above and below the seam being one option. Expected advantages are more production and less wear on the blades, as less rock will be cut accidentally.

An Interall 6100 based system is being designed at the National Coal Board's research centre at Bretby, near Burton-on-Trent. It

Called the Markman, it is based on an RCA CDP 1802 CMOS microprocessor.

Data can be collected from up to six induction loop sensors

Called the Markman, it is based on an RCA CDP 1802 CMOS microprocessor.

Data can be collected from up to six induction loop sensors

AMI wins SBS page-a-second scanning deal

THE contract to develop two prototypes of a high-speed computerised data-scan facsimile system for the IBM Satellite Business Systems joint venture has been won by AMI International, despite fierce competition from Fujitsu of Japan.

Under the contract, AMI International, which recently changed its name from Addressograph-Multigraph, will deliver two prototypes early next year. The requirement is a system which takes one second on average to scan an A4 page, and another one second to print it out at the receiving end.

The system thus needs a capacity of 3,600 pages an hour. This quantum leap forward in transmission speed is made possible by the ultra wide bandwidth which SBS will be offering users, in the 12-14 GHz band.

Use of this band will also enable the system to operate with roof-top antennae at the user site rather than communal satellite ground stations. Just as television aerials in the UHF band are much smaller than VHF TV aerials, so the microwave dish aerials used with satellite transmission get smaller as the frequency increases.

Another contract in connection with Satellite Business Systems, for the terminating equipment for computer-to-computer links over the satellite network, has been awarded to Bunker Ramo. In each case the contracts are for prototypes only, and users will not be restricted to equipment supplied by the chosen companies. Clearly, however, award of the prototype contracts will give the successful bidders a head-start over the competition.

Satellite Business Systems is a joint venture between IBM, Comsat and the Aetna Insurance company. Despite court action intended to smother the project at birth on anti-monopoly grounds, Satellite Business Systems hopes to begin service in January 1981, offering users high-speed intra-company transmission facilities for voice, data, facsimile and closed circuit television.

PO buys second Tesdata monitor

A SECOND Tesdata performance monitor has been bought by the Post Office data processing service. An MS88 system, valued at about £100,000, will be used at the Harmondsworth processing centre which runs equipment including an IBM 370/168, an ICL 2960, and three ICL System 4/70s.

The Post Office was the first customer in the UK for Tesdata's MS 38 monitor (CW, October 14, 1976) and has since used it in 15 major studies. Tesdata sales in the UK last year topped £1 million.



Antics that speed TV cartoon films

THE making of cartoon films for television has been greatly simplified by the development of a computer-based animation system at Grove Park Studios, Cumbria. The system, called Antics, is now in use at the Swedish Broadcasting Corp, running on a Univac 1100/11.

Conventional cartoon production requires the drawing by hand of enormous numbers of individual pictures. Antics helps get round this by enabling the artist to supply a few pictures of key positions of, say, a human figure walking along, and to have the intervening pictures supplied automatically by the machine. The completed sequence is displayed on a VDU and can be corrected if desired. It is then recorded on analogue video tape.

Initial drawings are digitised using a plotting table and a special light pen, as our picture shows, and while this is going on the drawing can be seen growing on the screen.

About 40 different operations can be performed on the completed drawing, such as enlarging, turning, reversing, and skewing, and sequences can be produced in which it rotates, rocks, and so on.

Over 100 separate coloured elements can be manipulated in one sequence, all moving in different ways.

All told, a film that would otherwise take six months to produce can be put together using Antics in a few man-weeks, the Swedish Broadcasting Corp claims.

The Univac machine is also being used for allocation of studio resources, cataloguing records, and keeping track of programme royalties.

ACT sees 4331 as a loss leader

HIDDEN additional costs to the IBM 4300 line reduce its apparent improvement in performance, but the machine still poses a substantial threat to competitors, with the new 1-year lease causing particular problems.

These are among the conclusions reached in a new industry Measures special study "Competitive Analysis of the IBM 4300", published by Advanced Computing Techniques of New York.

"On our assessment, the performance improvement achieved by the 4300 has been grossly over-estimated," ACT's Bob Fertig told Computer Weekly.

"They have been calculating on a processor and memory basis rather than a system software basis. In the latter case the improvement comes out between 1.5 and 3 times that of previous models." (These figures align with comparative data published in Computer Weekly on February 22.)

"We see the 4331 as a leader, priced on the same basis as the System 38, and designed to win over System 3 users. IBM's Data Processing Division

"But the real impact of competition will come out: the new technology built into the two-year lease. Compared to DEC, Univac, Burroughs, Honeywell and so forth, five-year leases to maintain their cash flow," he said.

He also expects IBM hardware and maintenance to rise 10% a year, and perceives a significant hidden cost to 370 users: conversion of files to the fixed block mode architecture.

ROBIN WEBSTER reports on the DP scene in Iran

US firms count the cost—and plan to go back

WHILE US computer companies still count the potential cost of their activities in Iran, a more detailed picture of the country's computer sector has emerged from Western advisors airlifted out.

Following the turmoil there, contracts between the pre-Khomeini government and US companies valued in excess of \$7,000 million have either been nullified or jeopardised.

Many of the contracts relate to the provision of electronic systems or weapons incorporating such systems, and although some losses have been made, many US computer companies are eager to return.

The question is whether, after the Ayatollah's demand last week that all Western and Communist influences should be removed, Iran will give US companies the chance to go back.

One part of the answer may lie in the fact that Iran needs Western technology and Western technicians to operate it. The second part, which supports the first, is that although companies like Control Data and Honeywell removed all their non-Iranian staff when things got rough, steps have been taken, with Iranian involvement, for the continued support of equipment in use.

In CDC's case, it airlifted out about 30 non-Iranian nationals in December but still operates an "as needed" service for machines in Iran from a centre in Brussels.

"CDC has continued to receive payments for its services and equipment in Iran," said a US spokesman, "and we hope to continue business activities there. We have not cut off links with the country."

Honeywell too will go back when possible, said a company spokesman in Italy.

"We evacuated the last seven of our staff from Iran about three weeks ago," he said, "but we have every intention of returning. There is no question about that."

One company which has revealed its losses is Electronic Data Systems, the management facilities company led by former IBM salesman Ross Perot, which is said to have lost most of the £20.5 million it was to have received for the installation of a national health insurance and social welfare system under contract to the Iranian Ministry of Health and Social Welfare.

In addition to this loss, Perot had to bear the cost of airlifting out two of his employees being held in Tehran's Gase Prison. This was achieved by the use of a team of ex-US commandos who bought the services of Iranian revolutionaries to storm the prison and release the men.

As for equipment already installed, EDS has had to face the fact that the Iranian government, which was reported to be about \$5 million behind in payments, is not likely to settle in full.

With more than a little US influence, the tendency appears to be one of using brute force methods to process what in the West would be looked upon as standard jobs.

It was not a case of machines being oversized by only three to four times," said one US source, "but differences of up to 5,000% could be seen. A lot of money was squandered on computers far too powerful for their applications. This was not so much due to the gullibility of the Iranians, but more to the hardness

in fact of US companies. Often, if a new application was planned, spare CPU capacity was not considered. Instead, a completely new system was often specified."

One estimate of the total number of computers installed in Iran puts the figure at upwards of 900, and during the street fighting and related disorder, many of these were inoperative. If it is to recover quickly, commented one industry source in the US, Iran must restore operations.

"The country is presently balanced between the prospects of achieving progress or reverting to a dark age," he said. "Computers are one method, if used correctly, by which the country can return to prosperous growth."



Supporters of the Ayatollah's militia survey a wrecked tank after battles with soldiers loyal to the Shah. After the revolution there is a need for much rebuilding in which many observers suggest that computers will play a major role.



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COMPUTER WEEKLY

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1978 vintage year for DP industry

ANNUAL results from Burroughs and Control Data and third quarter figures from Sperry Rand emphasise that 1978 was an exceptionally good year for computer business.

Burroughs' net profit rose 18% to \$253 million on turnover up 16% at \$2,460 million, with sales up 17% and rental and service income up 14%. Pre-tax profit margins improved from 18.5% in 1977 to 19.3% in 1978.

Underlining the gathering pace of new product introductions, Burroughs' chairman Paul Mirabito reported that the current year would be a significant one for new Burroughs machines.

Since he spoke, the company has launched its "900" family with two mid-range models, the B2530 and the B3650.

At Control Data, everything in the garden looked rosy, with profit up 42% at \$39.5 million on turnover up 19% at \$2,700 million.

Both computer business

and the Commercial Credit Insurance subsidiary contributed to the growth, but the profits in the computer business were particularly strong, rising more than 100% from last year's \$20.2 million to \$41.3 million.

Promising good earnings for the future, the company's rental base rose 21%, while OEM sales of peripherals were up a formidable 56%.

Confirming CDC's strength in education and computer services, this sector of the company's business reported turnover 18% ahead at \$395 million.

Sperry Rand Corp's financial year ends in April but for purposes of comparison also gives a figure for the 12 months to December 31. In this period, the company achieved 30% increase in net profit to \$214 million on turnover up 17% at \$4,065 million.

Univac represents about 50% of the Sperry Rand total, and the company reports that in the October-December quarter,

orders rose 24%, turnover rose 21% and orders in hand rose 16% over the comparable quarter in 1977.

Minimaker Prime stormed ahead, with net profit up 114% at \$8.4 million on turnover up 87% at \$93.5 million. It is confident that annual sales will continue to increase at an average 60% over each of the next four years.

Supercomputer specialist Cray Research benefited from a \$900,000 tax-loss carry forward to report net profit up 75% at \$3.5 million on turnover up 61% at \$17.2 million. It also reported that the Cray 1 computer at the European Centre for Medium Range Weather Forecasting, previously leased, has now been bought outright.

Chaucer venture

In a joint venture two Canterbury firms, builders Robert Brett and Sons, and Invicta Motors, have set up a computer service company called Chaucer Computer Services.



Cincinnati minis base for small business systems

SMALL business systems based on the Cincinnati Milacron range of minicomputers are to be manufactured and marketed by Cinsal Computer Systems, a new company formed jointly by software houses Rubicon Computer Systems and Data Networks.

After Cincinnati's first attempt to sell its commercial systems division to CSD International, a company set up by Milacron employees (CW, June 29, 1978), Rubicon and Data Networks stepped in with their bid. This was accepted and now Cinsal is to take over Cincinnati's European customer base while the US company turns its attention to numerical control.

The equipment Cinsal will market, under its own name, includes enhanced versions of Cincinnati's System 20 intelligent terminal, and System 40 and 70 disc-based minicomputers. Manufacturing will be carried out in the old Sunshine Bakery depot in Atterborough and 20 staff will be employed initially.

Conflict inside IBM 'exaggerated'

THE conflict between IBM's Data Products and General Systems Divisions is exaggerated, believes Aaron Orlansky, analyst with New York stock-brokers Oppenheimer and Co.

Talk of conflict has been spurred by competitive announcements from DPD and GSD over the past six months, such as DPD's 4331 and GSD's System 38, and the DPD 8100 which is designed to handle communications applications for which the GSD Series 1 mini has been offered.

Commenting on the clash between System 38 and the 4331, Orlansky noted that the relational database of the 38 was not suited to large-scale machines because it pre-empted too much of the CPU power.

"I expect IBM top management to limit the power of the largest GSD machines to prevent conflict," he told Computer Weekly. "IBM wants GSD to remain predominantly in the small companies market for which it was established."

"The two divisions operate in quite different ways. DPD salesmen have access to top management in large corporations, whereas GSD salesmen are confined to data processing or management services managers."

Controlling stock

UNIT Pallets of Golborne, Greater Manchester, has ordered a 128K byte Computer Technology CTL 8020 minicomputer to use for stock and materials control. The £40,000 system will also perform accounting functions including order book and sales and purchase ledgers. Due for delivery in the spring, the system includes two 10-Mbyte disc drives, three VDUs and a 240 line printer.

DIRECT handprint data entry with Guest Datapad is now being used by three clerical staff at Media Expenditure Analysis Ltd to capture information on 1.5 million advertisements a month that appear on television or in the Press.

The Datapad system at MEAL has 16 stations linked online to a Data General Nova 3 computer which records data on magnetic tape and interacts with each operator, checking on factors such as character sequence, field length and document sequence.

Before the Datapad system was installed, information declared to that now being captured directly was prepared on notes, documents and then punched on to cards. The Datapad system enables MEAL to supply customers — manufacturers, media owners and advertising agencies — with the information more quickly.

NEWS IN BRIEF

Marketing switch

RACAL-MILGO has taken over UK marketing of medium speed modems made by its sister company Racal-Vadic in California. Modem supplier Case, of Rickmansworth, whose agreement with Vadic was unaffected when Racal took over Vadic last year (CW, April 6, 1978) relinquished its exclusive UK marketing rights to Racal-Milgo by mutual agreement.

Case will continue to supply its existing customers.

Open for business

TWO new operating companies set up by the bureau and software house Computer Management Group start trading this month. CMG Barking, operating from CMG City offices at Eastgate, 63-73 Leas Street, London E1 8EY, gets with £550,000 worth of business including software contracts from the US and the Middle East. CMG Northern starts with £100,000 worth of business operating from a new address at Sunley Building, Piccadilly Plaza, Manchester.

Oil rig system

AN IBM Series 1 minicomputer has been installed by Shell to support consultancy and production system development. The system will be used particularly to support management information systems on tankers and refineries and will be used to Series 1's 100,000 words of memory at the end of the year.

ICL beats NCR

AUSTRALIAN manufacturer ICL has replaced its NCR data processing equipment with ICL equipment. The new system is a Series 1 minicomputer with a 100,000 word memory and a 240 line printer. Data is recorded on a magnetic tape and then sent to a computer centre where it is carried out on a mainframe.

Appointments

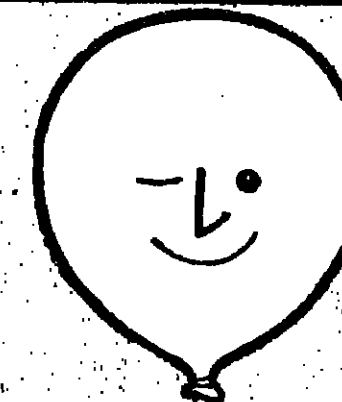
CHRIS PRIER
Assistant Classified
Manager
01-261-8028

LONDON
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Pete Williams 01-261 8019
John Prier 01-261 8000
Gordon Gibbs 01-261 8174
Ken Williams 01-261 8484

MANCHESTER/GLASGOW
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MYRIAD

DATA CENTRE MANAGER

NEAR BEDFORD

TO £8000

A leading international manufacturing company with a multi-million pound turnover is seeking to appoint a Data Centre Manager to their well established bureau facility.

The person appointed will take control of the bureau currently housing two large mainframes together with the data capture, data control and preparation departments. Responsible for providing an efficient user service, the Centre Manager will play a major role in expanding the service offered.

This is a senior appointment and candidates must be able to demonstrate sound Operations Managerial experience gained in large machine environments preferably incorporating experience of communications networks.

An excellent commencing salary is enhanced by a range of fringe benefits associated with a major organisation.

Ref. AW3/0804

INTERNAL CONSULTANT FOR A TIME SHARING USER TO DEVELOP PROPERTY MANAGEMENT APPLICATIONS

WEST END

£6500-£8000

An interesting and unusual position has arisen with our Client, one of the largest British based firms of Property Consultants and Surveyors.

The successful applicant will be responsible to one partner, whose activities of management, administration and further development he or she will inherit after a time.

Currently they are actively developing a Property Database using a timesharing bureau and are seeking an Analyst/Programmer to form a small one person department in the first instance to develop and enhance the company's application systems and generally liaise and co-ordinate computer activities.

The successful applicant will have a good academic background with both experience of programming and some analysis. Since a high degree of User content is envisaged applicants should ideally be good communicators with a mature and sensible approach to investigation, design and implementation of new applications in this interesting and little explored applications area.

The company offer a salary dependent on experience together with offices situated in the heart of London's West End.

Ref. E1/0803

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01-353 0981

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HERTS

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Applicants must be able to display a thorough knowledge of COBOL and produce program specifications to a predetermined design. He/she will possess the personality to manage a team of programmers through all stages of project development, controlling the quality of programming and analysis where appropriate. Experience of IBM utilities and/or OS JCL will be an advantage but not an essential qualification for these positions.

The successful candidates will be expected to retain a technical awareness in order to advise management on the latest data processing facilities and they will assist with the evaluation of software releases and long range planning. Additional responsibilities include the recruitment and subsequent training of programming staff.

The company has gained an admirable reputation for employee relations and is able to offer excellent career prospects. Generous starting salaries are further enhanced by a first-class pension and life assurance scheme, a staff restaurant and relocation expenses.

Ref. S1/0803

DEC PROGRAMMER

HAMPSHIRE

TO £6000

Our Client is the U.K. market leader in its field, and a member of a major international group. They are already well established as a committed D.P. user, with powerful IBM mainframes supporting a nationwide network of Datapoint machines, and have recently installed a DEC PDP11/34. They are currently seeking an enthusiastic person to assume responsibility for providing software and applications support to users of PDP11 based systems.

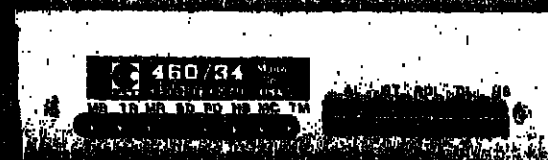
The person appointed will be able to offer a minimum of two years' experience programming a DEC machine. He/she will initially work on the development and implementation of a major new project, and will subsequently become responsible for the use of both internal and external resources to resolve operational problems and design and implement system enhancements, in a highly time critical environment.

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Ref. SW2/0803

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We are a progressive company expanding the computerisation of our Production and Financial Systems using an IBM 3970 linked to an IBM 370. We require a **SYSTEMS ANALYST** with experience in teleprocessing and in the development of production and financial systems. In addition, we require a **COMPUTER PROGRAMMER**. If you are ambitious and experienced in one or both of these fields and looking for a challenging job with wider responsibilities, write to me giving brief details of your training, industrial experience and salary progression to date.

The Personal Manager
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We guarantee that all applications will be treated in the strictest confidence.



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Top salaries offered for good, or potentially good, systems programmers for NEW IBM INSTALLATION

Quaker is a multi-national food, petfood, specialty chemicals and toys manufacturer, and has ordered EIGHT system 34 and system 38 computers for its EUROPEAN BUSINESSES.

First of the System 38's is scheduled as replacement for installed equipment at its UK Grocery HQ, West of London.

"ON-LINE" BUSINESS PACKAGES will be developed for installation at Quaker Grocery locations throughout Europe.

A Systems/Programming group is being set up to develop these new database systems.

Interested?
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QUAKER

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Uxbridge

Multi machine Data Centre

- IBM 3031 & ITEL AS/5-OS/VS1
- ICL 1903T - George II
- Excellent career prospects
- Training given on all hardware & software
- Generous relocation package

The Data Centre, which serves the needs of a thriving commercial group, has been expanded by the recent addition of an IBM 3031. This leads to the need to recruit the additional staff listed below. The bureau runs on three shifts - Sunday to Friday and the salaries quoted include shift allowance.

Shift Leaders £5,750-£6,750

The shift leader has reporting to him three senior operators, each of whom is responsible for one mainframe. High level managerial and technical skills are required for these senior jobs. An ideal technical background would be IBM 370 OS/VS1 under VM although a candidate of exceptional drive and supervisory ability with a 1900 George II background would be acceptable. All candidates should have 5 years + operations' experience.

Shift Technician £5,150-£6,150

The Shift Technician has wide ranging technical duties concerned mainly with IBM JCL, ICL George Macros, etc. It provides an opportunity for a technically oriented senior operator to put his ideas into practice. Previous IBM experience with a good practical knowledge of JCL is required.

OCC Computer Personnel Limited
16 Bedford Row, London WC1R 4EB

To apply, please write, complete the coupon or ring, asking for Marian Tabone on 01-242 9356 (day) or 01-555 5568 (evenings and weekends). If your experience is suitable, we would like to meet you to discuss matters further. Meetings can be arranged at the Data Centre in Uxbridge if this would be more convenient.

Comprehensive background notes are available to suitable candidates.

Senior Operators £5,150-£6,150

Each Senior Operator on a shift is responsible for one of the mainframes mentioned above. Candidates should have 3 years' experience and must be capable of scheduling, organising staff and training juniors. A background on either large or medium ICL or IBM mainframes is required. Training will be given to fill in any gaps in knowledge. Rotation between machines will be introduced in the future.

Shift Librarian £4,300-£5,300

The Shift Media Librarian controls the library on shift. A background in Data Control would be suitable. The main requirements being a very accurate and methodical approach to the work. A good clerical accounting background could be suitable.



I am interested in the position.

Name: _____

Address: _____

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Work: _____

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BRITISH AEROSPACE - KINGSTON

Due to continuing expansion within the SYSTEMS DEPARTMENT, we have a vacancy for a SOFTWARE PROGRAMMER with mini experience.

The Department currently operates an ICL 1908s-384K, under George 3. An ICL 2960 and a range of mini-computers are used for new systems development.

The requirement is for a SOFTWARE PROGRAMMER with at least one year's experience to work on development of a network of minis, communicating with mainframes.

The successful candidate is likely to have the following:

- * Programming experience on a mini (high-level language or assembler), preferably PDP-11 or VAX-11 under standard operating systems.
- * A relevant degree or professional qualification.
- * The ability to communicate with management, users and engineers.

This is a responsible position offering an attractive salary based on experience, and ample opportunities for career advancement. In addition the Corporation offers a Pension and Life Assurance Scheme, a Sports and Social Club (Squash, Football, Snelling, Licensed Bar etc.), excellent canteen facilities and where appropriate, generous assistance with relocation expenses.

Please write with brief essential details, or telephone for an application form quoting CW/45 to:
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Richmond Road,
Kingston upon Thames, Surrey KT2 8QS
Telephone: 01-548 7741.

BRITISH AEROSPACE
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SERVICE ENGINEERS

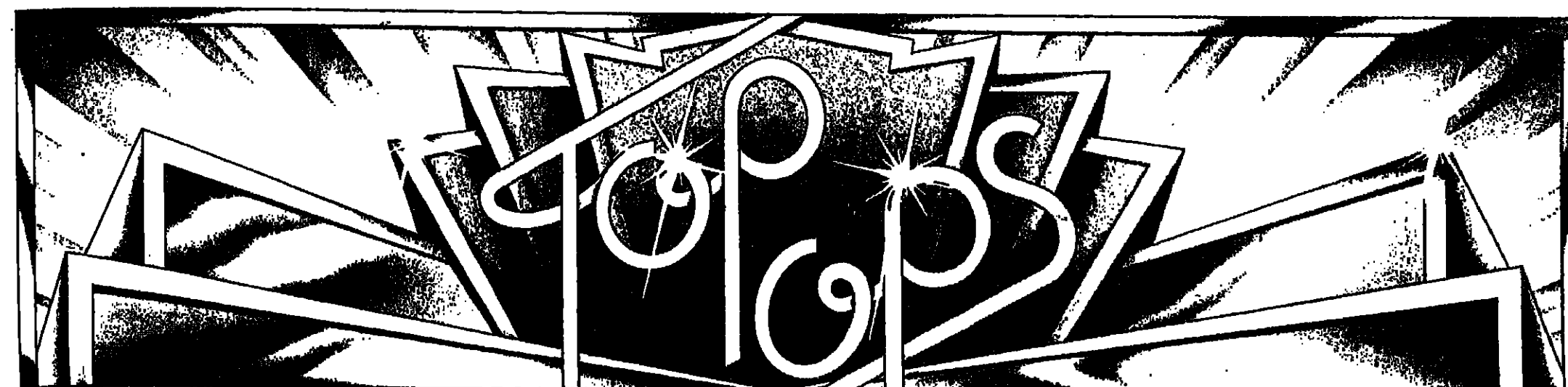
NEW CAREER CIRCA £6,600 +

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Start price £6,600 plus per annum.

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Knight

All vacancies are open to both male and female applicants. Phone anytime, or for an application form leave your name and address with our answering service.

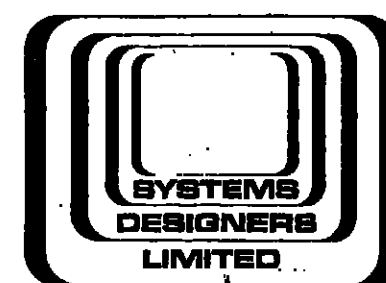
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Quality first

Join the experts— explore the frontiers of computing technology

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Successful completion of such projects has given us an unrivalled reputation, particularly in real time mini and micro applications, using the latest software techniques. It has also set us on an expansion path which promises professional software and systems engineers who join us now, a challenging and rewarding career throughout the 80's and beyond.

Systems Designers Limited is an independent British systems consultancy whose firmly established credibility and NEB backing ensure a confident and exciting future. Our staff, currently numbering some 200, share this confidence. They benefit from a company policy which offers maximum opportunities for rapid advancement through being involved with some of the most advanced computer systems in the world. Our continuing requirement is for Consultants, Engineers and Programmers who should have a good academic background and at least one year's software experience, although we will be very interested in hearing from final year undergraduates. Applicants should also be able to demonstrate a capability to work in new areas of mini and micro computer applications. We have a client base which covers UK, Europe, Middle East and USA, so there is a real opportunity to travel.

Our principal work areas are currently:

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The company runs productivity bonus, insurance and pension schemes and offers assistance with relocation if required.

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William Key



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This successful turnkey systems house are expanding their U.K. and U.S. operations. The Company are operating on DEC hardware and have specialised in banking, MIS and communications information services. They require:

- Team Leader Analyst/Programmers **c £7,500**
- Systems Programmers **c £6,000**
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to join the U.K. operation, but with career prospects internationally.

These jobs range from junior programmer to team responsibility — to qualify you obviously have to have a good programming background, with preferably some experience of real-time, on-line or T.P.

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Computer Staff Consultants

William Key

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c£4,500 - Mortgage (2 SHIFTS - NO NIGHTS)

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If you are in your twenties, with three years' good operating experience and supervisory ability, and are now seeking to enhance your career prospects in a thriving, rural area yet close to all amenities, telephone RICHARD BULGIN now on 01-483 2947 (day), or Rickmansworth 76143 (evenings/weekends) to arrange your interview, or write to him quoting Reference C9729, William Key & Partners, Freepost 4, London W1E 8UZ.

OR USE THIS COUPON

To William Key & Partners, FREEPOST 4, London W1E 8UZ

Name _____

Address _____

Telephone (Home) _____ (Office) _____



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OPERATIONS

- IBM OS **£5500**
Two years' exp. required for this post as a senior op. at this Central London site. A working knowledge of OS JCL would be useful.
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Operators with 1 yr. + experience required by two Companies in Central and East London: perks inc. free meals, pension scheme + bonuses.
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 - IBM DOS **£5100**
Been working in Operations for 2/3 years and willing to move down a peg to move into a better career path with the chance of junior management, then this Co. in North London is for you.
 - IBM SYS 3 **£4200**
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 - ICL 1900 **£4750**
Operators with 1 year + GII experience required for this site in West London.
 - ICL 1900 **£4000**
Operators with any ICL experience required for this installation in the City. GII and/or manual operating an advantage.
 - ICL 2900 **£4300**
Companies in West and North London require Operators with 1 year + experience in 2900/1900 VME or GII. Perks inc. four weeks hol., and sub. restaurant.
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- DATA CONTROLLERS, ALL AREAS £3000-£5000**
- TARGA COMPUTER SERVICES**
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LONDON EC2M 7NH

SYSTEMS ANALYSTS AND ANALYST/PROGRAMMERS GREECE

KHYKY is the Central Computing Centre for all Welfare and Health Services in Greece.

A. System Analysts
KHYKY seeks graduates with a minimum of 4 years' experience in the design and implementation of commercial or administrative computer applications for immediate employment as Systems Analysts to be involved in a variety of projects.

Post graduate studies in computer-related subjects will be a definite advantage.

The form and terms of employment will be commensurate to the applicant's experience and qualifications. For details write to:

KHYKY
Computer Center of Social Services
101 Syngrou Avenue, Athens, Greece
or ring ATHENS 9227.089

Applications should be submitted by the 15th of March, 1979. Applications received after that date will be considered in relation to future needs of KHYKY.

B. Analyst/Programmers
KHYKY seeks graduates with qualifications in System Analysis and Programming to fill 4 established positions in the specialization of Analyst/Programmers.

Selection will be by examination. Applications and enquiries should be made to the same address as above. Applications should be submitted by the 30th of March, 1979.

Research Assistants Technical Assistant

(Ref: DTR.8) £4880 to £5508 p.a. inclusive according to qualifications and experience

Three people are required for the Transportation Research Group whose primary responsibility is for the Borough Transportation Study and for transport data collection. Computing advice is also offered to other Groups in the Council, either within the same Directorate or elsewhere. The Group makes use of CDC 8600 and the main programming language is FORTRAN; previous similar experience would be an advantage. Access is also possible to IBM, ICL and SIGMA mainframe and a printer terminal with cassette unit is operated in the office.

Further information from Mr. Q. D. Stephens on 01-748 3020 Ext. 5241.

Application forms from Assistant Director (Personnel), London Borough of Hammersmith (BOC Building), Black's Road, London W6 9EG, quoting appropriate reference number. Closing date: 23 March, 1979.

Applications welcomed from Registered Disabled Persons:

Hammersmith

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- ★ FAC

Currently a wide range of vacancies exist for PROGRAMMING, SYSTEMS SUPPORT, SALES and MARKETING personnel who will be involved in a varied range of commercial applications in client oriented situations.

Based in Central London, the persons appointed will join a very successful team and can look forward to working on their own initiative and enjoy the opportunity of a varied and progressive career path.

In addition to an excellent remuneration package, ranging up to £12,000+ per annum, the company offers good conditions of employment and the benefits associated with a major organisation.

Ref AW1/0103

MYRIAD APPOINTMENTS LIMITED Computer Personnel Consultants
Telephone or write to: 30 Fleet Street London EC4Y 1AA 01-353 0981 (24 hrs)

THE UNIVERSITY OF ASTON IN BIRMINGHAM

COMPUTER CENTRE

SYSTEMS PROGRAMMER

A vacancy exists in the Systems Group of the University Computing Service. This group is responsible for the maintenance and development of systems software, in particular the George 3 operating system and associated software used on an ICL 1804S system. Current work also includes the development of file-editing and communications software on a CTL Modular One.

Salary on other Related 18 scale £3384-£6804 per annum.

Application forms and further details from Mr. A. G. Rees, Staffing Department, quoting reference number 6/189/CW.

The University of Aston in Birmingham
Gosta Green
Birmingham B4 7ET

ROTHAMPTON EXPERIMENTAL STATION
HARPENDEN, HERTS
AL5 2JG

SCIENTIFIC OFFICER/HIGHER SCIENTIFIC OFFICER

required in Physics Department to support the operation of a computer-based data acquisition system during field experiments into the effects of blage and drought on crop growth. Experience with microcomputer operation and/or electronic circuitry and instrumentation desirable.

Qualifications: Degree, HNC or equivalent in physics applied physics or electronic engineering. Acceptable post-qualifying experience is required for appointment to the higher grade. Driving licence particularly useful.

Appointment in grade of Scientific Officer (£2,800-£4,415 p.a.) or Higher Scientific Officer (£4,101-£4,449). Starting salary according to qualifications and experience. Non-contributory superannuation.

Apply in writing to the Secretary, giving name and address of two referees and quoting Ref. 388 by 23rd March, 1979. Further details on request.

Systems Programmer (AP3)

£3,420-£3,834 plus £312 supplement

To assist in the installation, maintenance and development of systems software on the Polytechnic computers which include a DEC-20, 11/40 and a Data General Nova

Further details and form of application from the Assistant Director and Chief Administrative Officer, Trent Polytechnic, Burton Street, Nottingham.

Closing date for receipt of application 19 March, 1979.

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Take Europe's fastest growing retail furniture group.

Take a configuration that will soon be one of the most advanced retail systems in the country. Take challenging development work and real prospects of early promotion.

Here at our Wembley Park HQ the existing hardware comprises 2 digital PDP computers which will support around 250 terminals on an RSX operating system. However, such is our phenomenal growth rate that we anticipate having to increase this equipment in the near future.

In addition we also have a further PDP for financial work.

So it's quite an installation — and one that offers experienced people (particularly with a systems background) really challenging systems development work. Our staff take over from the previous team.

The vacancies at the present time are as follows:

Systems Manager UP TO £8,500 + CAR

You will be responsible for coordinating the work of software houses and our own staff (such coordination is arranged directly and not through line management). You are now a Senior or Chief Analyst with management responsibilities and a leading role in systems development work. A company car is provided.

Analyst/Programmers TO £7,250 PA

Minimum 2 years' experience in programming, systems development.

can take you into work that offers exciting potential in systems and development very much for the person who is going places.

Deputy Operations Manager UP TO £6,000 PA

You are probably a Senior Operator or Operations Manager in a small installation at present — and have your own management in a more pleasant environment. There will be no shift work and you can expect an interesting problem-solving job with excellent opportunities for professional development.

Operators CIRCA £4,500 PA

Operators (preferably with experience on digital equipment) enjoy every prospect of a rapid up the promotion ladder as growth continues and hard work is upgraded. Salary is inclusive shift allowance.

As a successful large team MFI offers its staff generous and working conditions at a modern Wembley Park Headquarters are extremely pleasant.

Apply now for a fast-moving MFI with a fast-moving MFI. Write to: Personnel Manager, MFI Furniture Ltd, New Stadium Works, Road, Wembley, Middlesex. Tel: 01-903 1366. C/W 3008

(These vacancies are open to all)

How to meet Mr. Big without Mr. Middle getting in the way.

Not what you know, but who you know. How many times have you heard that?

And how often do you have to go through a self-interested third party before you can see the employers you would like to know?

We have a pleasant surprise for you. Lansdowne can arrange for you to meet the Decision-Makers without Middle-men getting in the way.

Over 3,000 good employers — big and small — use us to find new personnel for key jobs offering better opportunities and higher earnings.

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yourself including the names of companies you do not want to join... we will abide by your wishes. We'll also compare the information you give us to our clients' personnel needs. Every time the two match up, you'll be shortlisted and our clients will contact you direct.

You won't be pestered by us for dates, times, money or anything else. You'll just be asked by an employer, if you want to talk about a better deal.

Lansdowne Appointments Register, Design House, The Mall, London W6 9LS. Tel: 01-579 2282 (24-hour answering service).

Our clients are keen to meet men and women, aged 20 to 40 years, with potential earnings of between £4000 and £9000 p.a.

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CW 8/79

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Lansdowne

For those too busy doing a good job to find a better one.

Mini & Micro Programmers Designers + Analysts

London
Up to £8K

A prestigious Systems Group, subsidiary of a multi-national corporation has retained Matrix to aid in recruitment of new project members. Our client requires Programmers, Project Leaders and Systems Designers with either PDP 11 or NOVA 3 experience using PASCAL or Mini Assembler. Previous involvement in control systems based on multi-processor configurations would be an advantage but is not a prerequisite. Senior appointments anticipate 4 - 5 year directly relevant experience. Whilst salaries are high,

the prime attractions of these positions are job interest and growth potential. If you are an achieved Real-Time Mini or Micro specialist our client promises to meet any realistic expectations and will complete interviews and make offers without any of the customary delays. A number of fringe benefits accompany this excellent package and a company car will in many instances be provided. Please telephone quoting this advertisement reference. Ref. 1503/1

Minis-Micros Designers, Programmers

H. Counties & Cheshire
£6.5 - £9K

A prestige Client with Headquarters in London and regional offices located in Cheshire and throughout Europe urgently requires the following: Real-Time & On-Line Programmers & Systems Designers, Database & Compiler specialists with 2.5 years solid experience. Of particular interest would be people with relevant experience in one or more of the following: DEC with either BASIC, RTL II or CORAL, IBM or ICL with COBOL, Assembler or PL/I. Also Ferranti Argus or IMS or Database design specialties are welcome. The scope of projects is both broad and

demanding and certainly in keeping with the prestige of this client. You will play an important role in project development and will be given considerable autonomy in developing your technical expertise and enhancing your contribution to the work of this reputable group of which you will be more than proud to be a member. Matrix have been given a brief to pre-select suitable personnel and to recommend salary grades in line with our experience of prevailing market levels. We anticipate Salaries of between £6 and 9K being accepted. Ref. 1503/2

Mini Software at Logica

Holland & Belgium
£10,000 - £16,000 p.a.

Would you like to join the Dutch subsidiary of a world leader in Mini & Micro computer applications? The company itself is a British based international group with offices in five continents. They specialise in the supply of Bespoke turnkey systems based on Mini & Micro processors specifically in the Communications, Message Switching, Network, Process Control and basic software fields. Any assembler language is desirable. To meet their expansion goals they are creating numerous additional specialist

project teams requiring Consultants, Project & Team Leaders, Analysts and Programmers at various levels, specifically a) 5 years plus b) 2.5 years c) Trainees up to 2 years. If the idea of working at the sharp-end of sophisticated technical computer pioneering appeals and joining a very prestigious company is meaningful in your career development then you must give consideration to these opportunities. Ref. 1503/3

PDP-11 Project Leaders Senior Programmers

C. London
£6 - 9K

The foremost British Systems and Software Consultancy Group is seeking Senior project members in the areas of Data-Communications Message Switching and basic software. A prerequisite is experience of PDP 11 based systems ideally using RSX11M. Analysts/Programmers will be skilled in the use of either Coral 66, Macro 11 or PASCAL. These appointments are for a new Real-Time Systems division and successful applicants will have the opportunity to establish themselves at a very senior level in a short time

span. The Group anticipate offering salaries well above prevailing market levels with the objective of attracting top expertise. In addition to an excellent salary you will be offered an excellent package of fringe benefits and the promise of an early review. Travel opportunities are available to those who enjoy visiting Europe on business. A company car is available to some of the Senior appointees. Interviews will be held in London as soon as applications are received. Ref. 1503/4

Database Designers & Analysts

Holland, Germany & London
£6-8K (U.K.)
£10-15K (E.E.C.)

An International client with offices in London and Europe is entering another major expansion phase for which they require additional Database expertise including Project Leaders, Systems Designers, Analysts and Senior Programmers. The latter should be skilled in either PL/I, COBOL, Assembler or Mark IV. Both Database and Data-Communications experience would be welcome. Applications are varied but include Banking systems, Airline booking and Stock control. Not less than two years relevant experience will be considered and for more

senior positions 4 years is the minimum. U.K. based personnel may have frequent opportunity to travel to Europe and the U.S. (if desired). Europe based personnel are given very generous expenses and frequent paid trips back to the U.K. Salaries need-to-say are going to be well above the norm in keeping with the client's prestige and the importance which they place on the acquisition of these key personnel. You will be interviewed either in London or flown out for the day to Amsterdam or Frankfurt. Ref. 1503/5

Classifieds

Tel: 01-409 0468



360 Oxford Street,
London. WIN 9HA.

BASIC PROGRAMMERS with either commercial or scientific backgrounds required by Important Central London based Client. Permanent or contract positions available at salaries of £6-8K or £235 p.w. up. Ref. 1503/6

COBOL or PL/I programmers are required contract or permanent by a City Institution. IBM OS is preferred but DOS considered. Two years min. experience essential. Salary: From £5 - 5.5K plus 2 1/2 % mortgage subsidy or £250 P.w. Ref. 1503/7

HARDWARE ENGINEERS (Minis) with a desire to work in the training division of a major Mini computer manufacturer. A pre-requisite is experience of 8 or 16 bit minis. Salary up to £8.5K. Ref. 1503/8

CITY - Programmers for Merchant Bank with 1900/2900 experience including COBOL, Driver &/or Maximp would be advantageous. Salary c. £5.5K + mortgage. Ref. 1503/9

BRUSSELS - T.P. and D.B. Applications and Software Programmers. Prefer IBM software. Full relocation expenses and vast range of real company benefits whilst salaries to £16K. Interviews at our London office. Ref. 1503/10

BERKSHIRE/HANTS BORDER - Micro specialists (Intel 8080, Zilog Z80) required by turnkey systems supplier. Established U.K. company can offer outstanding career positions. Salaries to £8K +. Ref. 1503/11

DENMARK + GERMANY - IBM IMS end/or Univer 1100 DBMS applications exposure required for early 1979 start. Prefer permanent career person but consider contract. Ref. 1503/12

CICS Analyst/Programmer, O.S. or DOS with either COBOL or Assembler experience. Central London based. Salary dependent on experience to £7,250. Financial systems background preferred but not essential. Ref. 1503/13

CANADA

PRO-DATA SERVICES LTD. is a progressive software consultancy serving all facets of industry and government throughout Alberta. At present we are located in Edmonton and Calgary and due to the buoyant economy in Alberta, we have a requirement to expand our full-time staff level to maintain our leading position within the community.

We are interested in talking to **EXPERIENCED TECHNICIANS** who have a good track record in evaluating, designing and implementing computer systems in both the systems analyst and programmer role. A minimum of 3 years' related experience is required.

If you have experience in any of the following areas it would be advantageous:
★ Programming in COBOL, PL/I, or BASIC.
★ Data Base Management Systems/T.P.
★ Structured Design and Programming.
★ Commercial applications knowledge.
Interviews will be held in London, April-May, 1979.

If you are seriously considering a move to Canada, please apply in writing with details of qualifications and career to date to:

Pro-Data Services Ltd.
c/o Alberta Manpower Mobility
47 Upper Grosvenor Street
LONDON, W1X 9PG

HOWARD

BELGIUM £25,000 p.a.
TELEPHONY SOFTWARE

We are looking for several software engineers with telephony background particularly in the call process area. Systems Analysts Applicants should have 3 to 5 years' experience in real time systems particularly in the field of data communications. Experience of Basic or Assembler languages coupled with a top down structured design approach are essential (Ref. BJ270279b).

Programmer Analysts

To join a team to formally test the telephony software. Knowledge of assembler language coupled with a telephone, telex or data switching background would be ideal. Candidates should be experienced in debugging real time software and must be willing to do shift work (8 a.m. to 10 p.m.). (Ref. BJ270279b).

SWITCHING SOFTWARE PDP RSM11M PASCAL RTL2

Analyst Programmer

We are looking for an analyst/programmer to accept a very challenging and stimulating long term contract in a rapidly changing environment. From very loose spec. the need is to design software in PASCAL, code it in RTL/2 and integrate and test it. (Ref. BJ280279).

Contact: **B. Jakes 01-853 4066**
Howard Organisation International Ltd.
Employment Business Section
8 Elstree Way, Borehamwood, Herts
or Geoff King between 7 and 9 p.m. on Anytime 630506

MARINE SIMULATIONS

Our client is a World leader in the development of shipboard control and surveillance systems.

One of the most expanding and stimulating areas is the development of shipboard control and surveillance systems based on DEC PDP 11. We are seeking a very powerful hybrid computer systems designers, with DEC and real time experience, are currently being recruited for these projects. The successful candidate will see this as an opportunity to further their career and careers.

Please quote Ref. 10A

INTERLEX
MINI/MICRO RECRUITMENT

Systems Development Manager

Turnkey Systems - Birmingham
Top Salary + Car

We urgently seek to recruit a Systems Manager capable of developing modular package systems and controlling up to 50 Analysts and Programmers working to tight schedules. A sound applications knowledge is important, ensuring that the successful candidate will be capable of controlling feasibility study development and accurately forecasting developing times and costs. Knowledge of mini systems would be advantageous. Past programming experience at some point in your career will be a mandatory requirement. Experience of man-management is essential. Ability to prepare extensive tender documents and present software proposals at user board level will be important. This is a new opportunity in a small, fast growing Data Centre, offering a high flying Manager the chance of rapid progression based on the ability to get results. At a later date, profit sharing opportunities will be created for a successful Manager with good career development prospects. We must emphasise a sound applications knowledge as being essential, along with the ability to control and direct a technical/software development section. Systems tendered vary from £15,000 to £300,000 each. No candidates under 30 years of age will be considered. Relocation assistance will be given where appropriate. Salaries will be negotiable. No one earning under £7,000 is likely to have the necessary experience to handle the complexity and pressures of this managerial role. Apply initially to the Managing Director's Secretary for application forms. Telephone 0782-623865 and ask for Sandra.

For application
form see page 37



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61-63 Lower Street
Newcastle-under-Lyme
Staffs ST5 2RS
Telephone 0782 623865
(10 lines)
Register NOW!

For application
form see page 37



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THE COMMISSION OF THE EUROPEAN COMMUNITIES

Joint Research Centre - Ispra Establishment (Italy)
is seeking
for the Information Analysis and Data Handling Division

A SCIENTIST

(REF. 571/78)

with university degree or diploma in COMPUTER SCIENCES, with particular emphasis on DATA BASE MANAGEMENT and INFORMATION SCIENCE.

He will collaborate, within the SCIENTIFIC DATA MANAGEMENT SECTOR, in the methodological and informatics support to the Joint Research Centre's data bank projects. His function will include:
• direct participation in the design, implementation and maintenance of data banks and associated services
• identification of general problem areas which give origin to autonomous development and/or research
• participation in the R & D projects of the sector in the field of information science (automatic document processing, high-level data base interrogation languages, distributed data bases, etc.).

An experience with ADABAS would be advantageous - A thorough knowledge of one Community language and a satisfactory knowledge of one other Community language, preferably English, are also required.

A PROGRAMMER

(REF. 0/79)

with advanced technical secondary education and certificate in COMPUTER PROGRAMMING.

He will: • participate in the R & D projects which concern automatic documentation and data base interrogation languages • give technical support to the data bank projects of the Establishment, which include: design and set-up of data bases, design and implementation of programs and procedures for loading and maintenance of the data bases and of the interfaces with users application • participate in the activities of the "Data Base Administrator".

A thorough knowledge of COBOL, FORTRAN and ASSEMBLER languages, and of analysis, program design and techniques, are essential - Experience of non-numerical data processing in data base environment is also required, as well as a thorough knowledge of one Community language and a satisfactory knowledge of one other Community language, preferably English.

Recruitment criteria, based on the staff regulations and salary scale applicable to temporary agents of the European Communities: Temporary contract, up to five years, with possibility of renewal. Salary according to age, qualifications and experience. Other benefits include family and expatriation allowances. Only nationals of the Community Member States may be considered for the above posts.

Replies, WHICH MUST CLEARLY SPECIFY THE REFERENCE OF THE POST APPLIED FOR, should be sent to the following address, together with a detailed curriculum vitae and copy of degree or diploma:
JOINT RESEARCH CENTRE, Administration and Personnel Division, I-21020 ISPR (VA), Italy.
WITHIN TWO WEEKS OF PUBLICATION.

The candidates are requested to apply separately for each post they may intend to compete for.

IF YOU TALK OUR LANGUAGE LET'S TALK BUSINESS

CONVERT TO BYTES TO REMOVE AT EXIT
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ASSUME ILLEGAL DISC OR DRS SIZE
DIVIDE CODE BY 2
IF CC ILLEGAL DISC CODE
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MAP TO DIRECTIVE DISPATCH TABLE
IF TO ILLEGAL DIRECTIVE
POINT TO PROPER TABLE ENTRY
DRS SIZE MATCH?
IF YES NO
GET ADDRESS OR DIRECTIVE ROUTINE
FROM THE DIRECTIVE SIZE AND MARK BYTES

SENIOR SOFTWARE ENGINEERS to £8000 plus

Systeme is a major British manufacturer of mini-computer based business systems, with a remarkable track record. It's consistent success ensures a highly stimulating working environment and significant opportunities for staff to extend their experience and income.

The company's development plans require the appointment of **SENIOR SOFTWARE ENGINEERS**.

A minimum of three years relevant experience is required, preferably including a period of working in assembler code.

at system level. Successful applicants will work in an expanding department and will be responsible for major software developments. These projects will include developments related to operating systems and tele-processing monitors for PDP 11's & VAX 11's. Pension and bonus scheme with a company car in some cases. Relocation assistance is available. Write or telephone to: Personnel Manager, Systeme, Concorde Computer Centre, 232 Devesbury Road, LEEDS LS11 7DF. Tel: 0532 707411.

SYSTEME

Applicants are invited for the following posts working with the recently installed ICL 2970 computer at the Authority's Computer Services Department based in Bradford. The posts will involve working variable alternating shifts of 0730 hrs-1930 hrs Monday to Thursday, 0730 hrs-1500 hrs Friday, and 1430 hrs-2230 hrs Monday to Thursday, 1400 hrs-2200 hrs Friday for which an allowance of 1.5% of salary will be paid.

ASSISTANT SHIFT LEADER

£8,191-£9,967 p.a. inc. shift allowance - Ref. No. 818/79

Applicants should have several years' experience of large-scale computer operation including supervisory responsibility. They will be required to attend in for the Shift Leaders during their absence, and also provide cover at installations in the Authority's Divisions as required.

Application forms are available from the Regional Personnel Officer, Yorkshire Water Authority, West Riding House, 87 Alton Street, Leeds LS1 5AA (Tel. Leeds 448201) 9.00-5.00 p.m. where they should be returned by post latest 10 March 1979, quoting the appropriate reference number.

Yorkshire Water

FREELANCERS

Major Consultancy working through the UK and abroad require

MEN OR WOMEN ANALYSTS/PROGRAMMERS

with initiative to work on small business and scientific systems mainly in the Midlands. Experience with mini-computers and production systems programmed in BASIC would be an advantage.

Please write with an outline of career to date, stating degree of competence in languages and machines used. Please also indicate availability.

Box 1016 COMPUTER WEEKLY

D.P. MANAGER

£7.5K plus bonus

Expand a department that uses a Burroughs 8800. The company has international connections and is looking for an ambitious applicant with programming and systems experience in an accounting environment on a similar machine.

For daily interview telephone 01-405 0854 now quoting Ref. JE/330. ORAKE SENIOR APPOINTMENTS CONSULTANTS, 121 Kingsway, London WC2.

Drake Senior
Appointments



KUWAIT 25K PACKAGES

Our clients, Inter-Consult, Kuwait's largest Consultancy, has a large range of additional vacancies to cope with ever-increasing client demands. They need a wide range of experienced IBM and CMC staff. IBM Senior Analysts/Programmers with CICS ASSEMBLER capable of advising on the development of the Banking Systems are urgently required. Experience of IMS or DL/1 would be advantageous. Additional requirements include Analysts, Programmers and Analyst/Programmers to work in Banks, Ministries and Oil Companies, including major trading groups. Staff with CMC programming experience are urgently sought to assist with Turnkey Systems support in Kuwait.

Consultant: Don Philip (021-454-7906).

SYSTEMS ANALYSTS/NORTH WEST

E.M.S. urgently needs to recruit a large number of 2 years plus experienced Analysts to work on a wide variety of commercial systems. Opportunities exist for involvement on real time, database and networking systems, as well as general commercial and merchandising systems. Working for a consultancy involves a variety of site assignments with later involvement supporting Turnkey Systems teams working in your home area. We offer excellent career development prospects with adequate opportunity to either specialise in local region support tasks, or the choice of national and international travel if required. Analysts should have at least 2 years' systems experience in a commercial or industrial environment. Relocation expenses will be paid where appropriate. Candidates should be aged 23 upwards and preferably hold a current driving licence.

Consultant: Don Philip (021-454-7906).

PROJECT MANAGERS C£6,500

Applications are invited from experienced Project Leaders and Managers interested in joining a rapidly expanding Turnkey group based near Central Birmingham on the Fiveways roundabout. We need professional, competent team Managers, capable of planning, scheduling and implementing modularised application systems, configured on mini and micro processors, to an agreed time scale. Ability to design and control the development and final testing of complete systems will be important, as will an adequate programming knowledge for quality checking the work of other team members. Ability to undertake feasibility studies and accurately assess and cost systems and programming requirements to fulfil total client requirements will be an important part of your managerial duties. A wide range of clients are available, covering all sectors of industry and commerce. Car owners will be preferential for this level of appointment as client visits and presentations will be involved. We seek mature, constructive thinkers capable of designing effective application systems and motivating teams assigned to them.

Consultant: Don Philip (021-454 7906).



EMS Consultants Ltd.
61-63 Lower Street
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COBOL PROGRAMMERS

European Assignments

2900 VME/B

PROGRAMMERS and SENIOR PROGRAMMERS to £13,000

SENIOR PROGRAMMERS with IDMS and TP EXPERIENCE to £17,000

INTERESTING PROJECTS
DATABASE/DEVELOPMENT
HIGH REWARDS (£££)
TRAINING OPPORTUNITIES

Programmers with 2 or more years' COBOL experience are required to work on challenging and interesting projects as part of Marcol's European team who are achieving substantial successes on the Continent. Preference will be given to those applicants who have VME/B or VME/K experience, however ICL 1900 and 2903/4 programmers who are willing to undertake a 3 to 6 month training program in the U.K. should also apply. Unlimited career prospects are possible at:

MARCOL

For full details and a confidential interview please ring or write:
Derek Ashley or Penny Bailey

Total capability from the
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SOFTWARE AND COMMUNICATIONS SPECIALISTS

Berkshire

up to £10,000

We have been retained by an international organisation who are recognised as a leading company in the development of computing, both in the software, hardware and applications field. Many of their projects span a whole range of sophisticated techniques from micro-processors through communications, middleware, database to operating systems.

There are currently several vacancies at Programmer, Designer and Project Leader levels within the Software and Communications groups for staff with a desire to work in a professional environment on new development projects.

SOFTWARE SPECIALISTS

Applicants for this group must have at least three years experience working on one of the established operating systems such as EXEC 8, OS/DOS or VME-R/K either in a development, maintenance or enhancement role. One or two positions are available for people with a background of T/P, networks or other similar types of software.

COMMUNICATIONS SPECIALISTS

Candidates should have at least five years experience in the d.p. industry with the early part spent in applications development and the latter two or three years in the design of communication and network systems. A background of message switching or work on significant networks would be ideal.

If you would like to discuss these opportunities further please contact JIM BAKER.

JAMES BAKER ASSOCIATES
International Personnel Consultants
16 Maddox Street, London W1
Tel: 01-491 4478

MYRIAD

IBM SYSTEM 38 IN GUILDFORD

SENIOR PROGRAMMER ANALYST/PROGRAMMER

TO £7000 + BONUS

Applicants for these positions will have gained a strong knowledge of RPG II (3 years +) on IBM equipment and have a good understanding of CCP. A background in commercial systems will be an advantage but full training will be given in O & M, D.P. and business procedures. The data processing department is engaged on a variety of development projects (most of which use on-line techniques) and has expansion plans that continue well into the next decade. A System 38 is on order to replace the System 3 currently installed, so persons joining the company can now be assured of an interesting and rewarding future.

In addition to a pension scheme, four weeks' holiday, BUPA and L.V.s, employee benefits include a generous annual bonus. The offices are easily accessible by road or rail from most parts of Surrey and relocation expenses are paid where applicable.

MYRIAD APPOINTMENTS LIMITED (Computer Personnel Consultants)
Telephone or write to:- 30 Fleet Street, London EC4A 3AA 01-353 0981 (24 hrs)

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All classified copy should reach our offices no later than 5.30 p.m. on the Monday preceding Thursday's publication. If complete artwork is supplied 12 noon on a Tuesday.

Ring David Abbey for further details on 01-261 8016

Don't
PROGRAMMERS, OPERA-
TORS, ANALYSTS
WISH YOU WERE HERE!
Sincerely, PAMELA
VP

OPPORTUNITIES AT REMPLY

Remply is a multi-industry organisation with 87 factories nationwide. We have four vacancies at our Head Office in North West London; the successful applicants for these four posts will be working on further developments to the Company's on-line system on I.C.L. 1901T. They will also be working on micro-computer systems to be installed to handle business systems within our factories.

SENIOR SYSTEMS ANALYST

Salary range £6000 p.a. - £8500 p.a.

Applicants must have at least 4 years' computer experience, and must have taken at least one system from design stage to implementation. I.C.L. experience is desirable.

CHIEF PROGRAMMER

Salary range £6000 p.a. - £8500 p.a.

Applicants must have at least 4 years' programming experience, and should be able to control junior staff. I.C.L. 1900 experience is essential, preferably including "Direct".

ANALYST/PROGRAMMERS

Salary range £5500 p.a. - £8000 p.a. and £5000 p.a. - £7500 p.a.

Applicants must have at least 2 years' programming experience in "COBOL". I.C.L. experience is desirable.

We offer the usual benefits associated with a large company including generous holidays, pension and life insurance and subsidised restaurant.

Please write to Recruitment Manager, Remply Ltd., 418 Edgware Road, London NW2 6LP, or telephone 01-452 8020 ext. 311.

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LONDON

£7500-£12000

If you are interested in recruitment but do not have the necessary experience Myriad may be able to give you the opportunity to train as a Recruitment Consultant.

As one of the major companies in our field with a well established professional reputation, we have both the resources and expertise to train you in the skills needed to carry out this challenging and rewarding work.

You must have a background in the computer industry, such as programming, analysis or any sales orientated position. Without this essential grounding you could not be expected to give career advice to applicants or advise clients in major recruitment assignments. Under 35 you should possess the potential to succeed in highly sales orientated situations in which you will have the freedom to work very much on your own initiative.

The wide range of activities encompassed by the work will undoubtedly surprise you. You will also be interested in your training and career development. To find out the answers and much more about the varied and interesting life as a recruitment consultant, contact us to arrange an informal discussion and we will also tell you about the outstanding long term career opportunities available.

Ref: AW2/0803

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Telephone or write to:- 30 Fleet Street London EC4Y 1AA 01-353 0981 (24 hrs)

SMR Sales & Marketing Recruiters Ltd
Victory House, 99 Regent Street, London W1R 7HB

U.K. MARKETING MANAGER DESK TOP SCIENTIFIC AND TECHNICAL COMPUTERS LONDON BASED

This is a unique opportunity to join one of the world's top marketing organisations. Our client is seeking a person to lead a young enthusiastic team of sales development executives at their Head Office. This group provide product management, sales development and sales support.

Candidates must demonstrate the ability to manage this group as well as to create and communicate ideas both to the field force and senior management. The team is responsible for the analysis of the market, the application areas, the competition and pricing policy. They develop software, promotional material, sales campaigns and liaise with advertising and training departments.

They also fulfill the traditional product management role of providing feedback to the R & D group to influence future product design and marketing concepts.

Ideally you should have:-

1. Two years successful selling and if possible sales management experience in this market area.
 2. Marketing experience preferably in this area.
 3. Knowledge of the scientific and technical application areas.
- Preferred age 25 - 40.

Travel within the UK is involved plus occasional trips abroad.

Total Remuneration c £10,000pa

Plus generous car allowance, BUPA and the fringe benefits of a large company.

This opportunity is open to both men and women.

Please apply quoting reference no. SD039, to Bernard Conn or Elizabeth Attwell.

Tel: 01-734 9776

A Sales and Marketing Services Company
TRAINING, PROMOTION, RESEARCH, RECRUITMENT

UNIVERSITY OF MANCHESTER REGIONAL
COMPUTER CENTRE

Director: Professor Gordon Black

Applications are invited for the following vacancies:

PROGRAMMER

The successful candidate will work a team responsible for the maintenance and implementation of different compilers. Applicants should be educated to degree standard and have experience of systems programming together with knowledge of FORTRAN and one other high level language. A knowledge of COBOL and/or PL/I would be an advantage.
Salary: £3,384-£5,604 p.a. or £3,883-£6,555 p.a. dependent upon qualifications and experience. USS Ref: 46/79/CW.

ASSISTANT
COMPUTER OFFICER

This post will be in the liaison and training section which is responsible for maintaining direct links with representatives in some 60 user sites and departments. The work involves advising and helping users with a wide range of backgrounds and experience. An effective communicator, interested in dealing with people and with a knowledge of one or more high level languages is required.
Salary: £3,384-£5,604 p.a. USS Ref: 46/79/CW.

Further details and application forms (returnable by March 28th, 1979) are obtainable from the Registrar, The University, Manchester, M13 9PL, quoting the appropriate reference.

WILTSHIRE

ANALYST/PROGRAMMER up to £6,000

Our clients, Union and Trust Ltd., an expanding international group of companies using advanced computer systems, wish to recruit an Analyst/Programmer. Their current hardware configuration, a Burroughs 3700, is being replaced by three ICL 2903/4s, and in line with the development environment, ICL's financial production packages LUCRE and OMAC will be implemented in conjunction with existing systems.

The suitable applicant, male or female, will have at least three years' total programming experience, and will be able to show a reasonable level of systems involvement. A knowledge of ICL software and hardware is essential and previous involvement with LUCRE and OMAC would be an advantage.

TRAINEE PROGRAMMER - Salary Neg.

To assist in the implementation of the systems development currently in progress, the suitable applicant will have a minimum of 3 months' practical COBOL experience. Alternatively this position may appeal to a person who has just completed a training scheme, e.g. a TOPS course, and is ready to start a career in computing.

Situated close to Swindon, with easy access to the M4, the company offers a career opportunity and prospects. Benefits include paid overtime, pension scheme and assistance with relocation expenses where appropriate.

Applications for this position will only be considered through Sanders. Executive. Please phone or write in the first instance to Chris Wilson, 8a Prince Victoria Street, Clifton, Bristol.

Sanders 8a Prince Victoria Street
EXECUTIVE RECRUITMENT
TELEPHONE 0272 39302

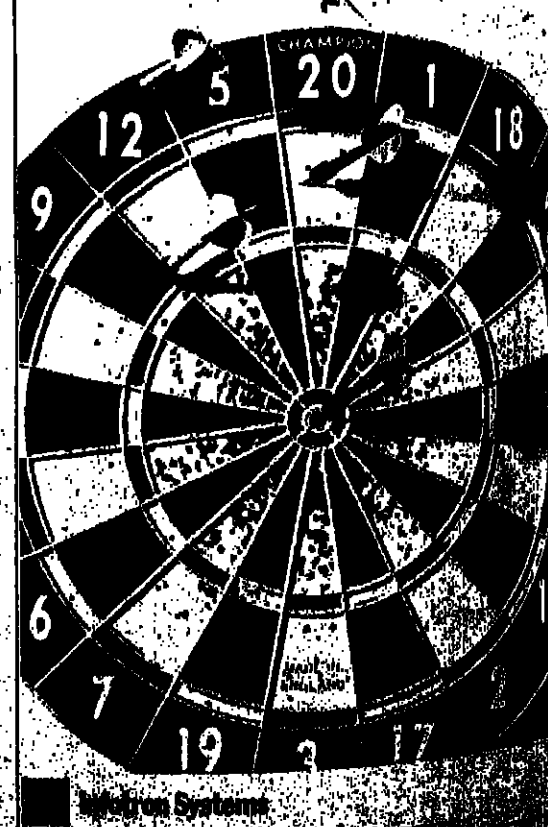
BULLSEYE!

Infotron Systems are looking for winners

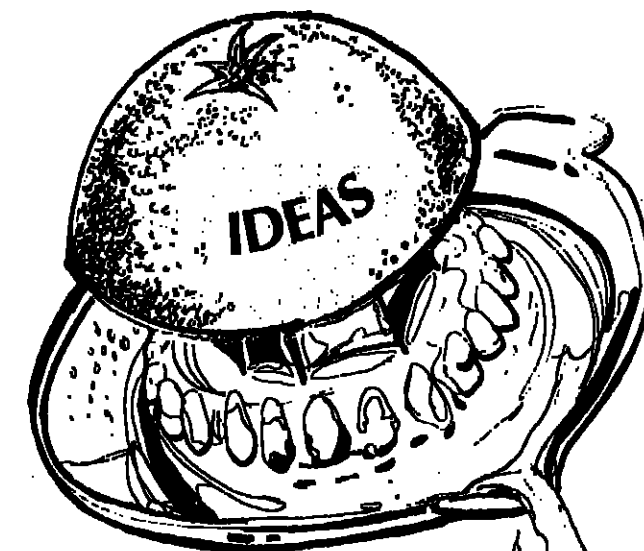
Infotron Systems Limited is a rapidly expanding young company in the field of Data Communications, specialising in microprocessor based Time Division Multiplexers. We are looking for Sales Personnel to help us with our growing market throughout Western Europe and wish to recruit Regional Sales Managers, Sales Engineers and Technical Support Engineers. Salary levels are high with commission payments where appropriate. We can promise an interesting and exciting job in a team whose contacts and friends extend across the world.

Telephone or write and let us arrange an informal interview in London or Dorchester:

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Dorchester (0308) 66016



Software Programmers needed to extract the most from our orange boxes



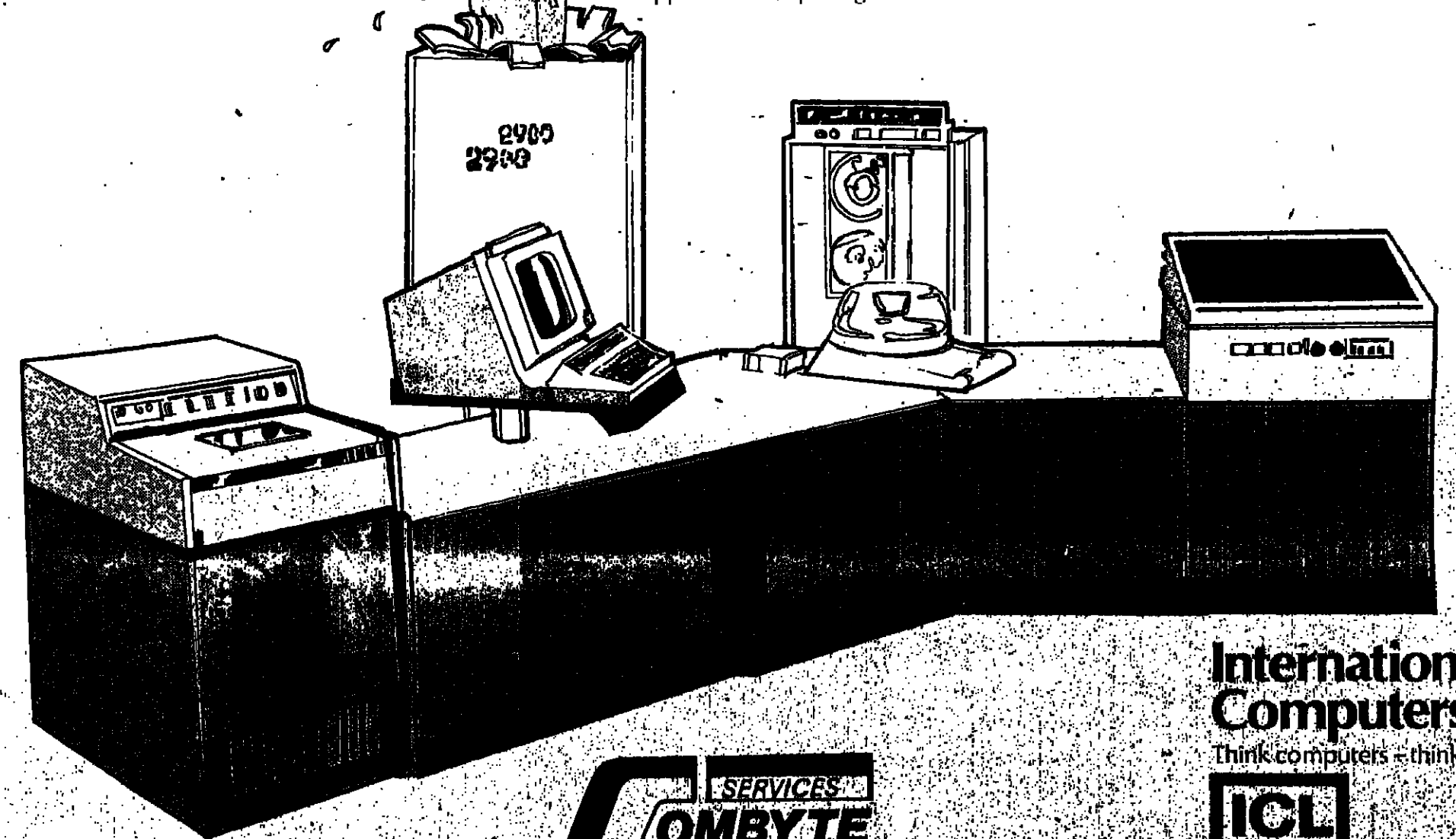
ICL has made a number of major announcements for DME and 2903 style products in the last year. Because of the striking success of these products, we are expanding the development unit involved and need a further 10 programmers immediately.

Systems Programmers & Microcoders (Bracknell)

These positions will suit programmers already involved in Operating System Development, who wish to expand their experience of System Software. However applications programmers with 2 years + experience of Assembler level languages, will find this an ideal opportunity to branch into Systems Software. When you join us you will work in small highly motivated teams developing the DME system for the 2900 series using sophisticated Software Engineering tools.

For IMMEDIATE INTERVIEWS and further details of these exciting opportunities along with other benefits, including a special relocation package and participation in the 1978-79 Self Financing Productivity Scheme on top of a starting salary of £4.5k to £7.5k.

Contact MARILYN DAVIDSON the Consultant advising us on these appointments, quoting ref. CW1.



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**International
Computers**
think computers - think ICL

ICL

THE COMMISSION OF THE EUROPEAN COMMUNITIES

Joint Research Centre - Ispra Establishment (Italy)
is seeking for the Informatics Division:

A SCIENTIST

(REF. 580/78) with university degree or diploma in **COMPUTER SCIENCES**.

To be charged, within the **SYSTEMS AND BASIC SOFTWARE SECTOR**, with evaluation tests on software, especially on **TELEPROCESSING** software. His tasks will include:

- 1) design and development of programs and/or test inputs which serve to guarantee that: ☐ products, when in operation, respond to the specifications; ☐ possible interfaces with other software elements are perfectly respected; ☐ efficiency of software is at least equal to expectations;
- 2) responsibility for the liaison with, and verification of the documentation to be transferred to, the "Informatics Support Sector";
- 3) any other requested work in the field of software development.

A thorough theoretical and practical knowledge of **PROGRAMMING TECHNIQUES** is essential - The function implies an ability to establish efficient contacts with colleagues.

A very good knowledge of English and a satisfactory knowledge of French or Italian are also required.

A SCIENTIST

(REF. 520/78) with university degree or diploma in **ELECTRONICS** or **COMPUTER SCIENCES**.

He will be **RESPONSIBLE** for the **COMPUTER SECTOR** and will report directly to the Head of the Informatics Division.

His tasks: ☐ studies related to the choice of hardware; ☐ technical contacts with the suppliers; ☐ organization of the facilities, daily management and running of the hardware of the computing centre and of the teleprocessing network.

A thorough knowledge in the field of **COMPUTER HARDWARE** and experience in conducting an **IMPORTANT TEAM** are essential.

A very good knowledge of English and a satisfactory knowledge of French or Italian are also required.

Recruitment criteria, based on the staff regulations and salary scale applicable to temporary agents of the European Communities:

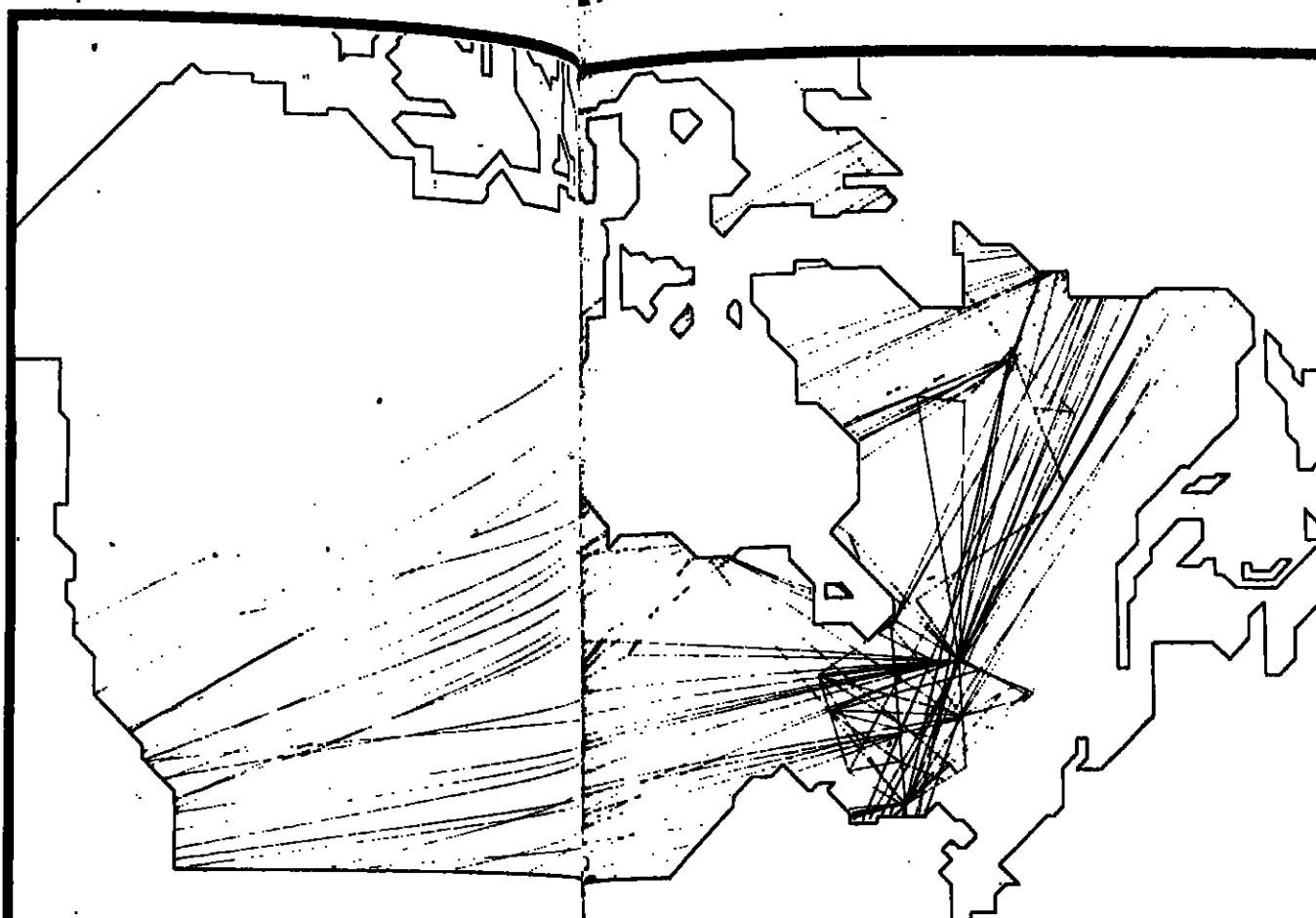
Temporary contract, up to five years, with possibility of renewal - Salary according to age, qualifications and experience. Other benefits include family and expatriation allowances.

Only nationals of the Community Member States may be considered for the above posts.

Replies, **WHICH MUST CLEARLY SPECIFY THE REFERENCE OF THE POST APPLIED FOR**, should be sent to the following address, together with a detailed curriculum vitae and copy of degree or diploma:

JOINT RESEARCH CENTRE, Administration and Personnel Division, I-21020 ISPR (VA), Italy
WITHIN TWO WEEKS OF PUBLICATION.

The candidates are requested to apply separately for each post they may intend to compete for.



Canada

Canadians can justify that Canada is still the land of opportunity - a land where the individual's effort and merit to be rewarded, free to be encouraged and where high technology is seen to be a tool by which the lives of the community as a whole can be enriched. It is a country which offers a wide variety of life and social activities and room to breathe.

Bell-Northern Research

known more commonly as BNR, is one of the foremost telecommunications research organisations - a Canadian Corporation jointly by Northern Telecom Limited and Bell Canada, which was initially conceived to meet needs for an indigenous source of telecommunications design for Northern Telecom. It is important to note that neither BNR nor its parent companies are related in any way to the American Bell system of companies.

Now we have an enviable international reputation and many contractual agreements with independent telephone companies, government agencies and firms in related fields; and we have major resource centres located in Ottawa, Montreal, Toronto and Palo Alto, California, to meet these demands.

Our success and our continued ability to respond to an ever-changing environment across the thresholds of new technology mean we can offer outstanding opportunities to professional, ambitious men and women who wish to progress their careers and be involved in projects from inception to completion.

Systems Design & Research

Emerging technology is making possible new communications concepts and markets. However, new technology by itself is not enough. Existing communications systems, economic, societal factors, and human factors must all be considered. In Bell-Northern Research, the systems divisions has the responsibility to carry out the research and analysis required to relate these factors in planning telecommunications systems of the future.

Our systems people are market researchers, engineers, computer scientists, mathematicians and operations research analysts, economists and others with a multidisciplinary outlook. These teams of specialists ensure that the technology developed is effectively integrated into systems that meet end-user needs and fulfill future market requirements.

Continued growth and promotional moves have created numerous opportunities for oriented people within our various systems groups.

Digital Switching Systems

- are key elements in our rapidly evolving totally integrated digital telecommunications network. Key individuals with experience in, and a broad knowledge of communications are needed to work in the areas of central office, PBX, new business services and systems interface planning.

Opportunities in this department are:

- carry out systems planning studies for the introduction of both large and small digital switching systems
- plan the configuration of digital switching machines to provide both current and future business services switching features
- identify the switching capability requirements for future telecommunications network offering and evaluate them in relation to evolving switching technology
- assess switching architecture alternatives and basic restraints in the light of technological trends with the objective of optimising future generations of switching systems.

Operations Systems

- have been transformed by computer technology. The introduction of processing and computing capability in the telephone network is providing opportunities for implementing new services and for changing the operation of the network.

Opportunities in this department are:

- definition and introduction of common channel signalling
- automation of operator functions
- introduction of systems to modernise the network control, management and data collection function.

Maintenance Systems

- include alarm, test and remote surveillance systems and incorporate the latest computer technologies and state-of-the-art test techniques.

Opportunities in this department are:

- define maintenance features for all new product offerings
- study and define improved means for maintaining digital switching systems and trunk and subscriber facilities.

Appropriate experience for the above areas should be augmented by a knowledge of communications systems or skills acquired in some of the following areas:

- product development processes (H/W and S/W)
- digital transmission/switching systems and technologies
- data communications
- engineering economics
- local/long network planning
- mini and micro-processor technologies (H/W and S/W)
- measurement and signal processing techniques

SYSTEMS PROFESSIONALS-

Broad innovators with imagination...
to look beyond existing technology to identify
communication products for tomorrow.

Fibre Optic and Digital Transmission Systems

Planning has begun for introduction of fibre optic systems. A team of systems, technology and development specialists is presently being assembled to initiate the introduction of state-of-the-art fibre optic systems in the trunking and distribution network.

Opportunities in this department are:

- plan the large scale implementation of fibre optic systems for transmission and delivery of existing and future narrow band and broadband services
- integrate technological advances into digital subscriber carrier systems.

Individuals should have a good knowledge of communication systems or skills acquired in some of the following areas:

- communication networks
- current and future technologies (especially LSI, fibre optics, microprocessors, video, software)
- existing and possible future communication service offerings (broadband and narrow band)
- system design and optimisation
- digital channel banks.

Network Planning & Standards

The flood of new services made possible by digital switching and transmission systems is having a profound impact on the telecommunication network. Subscriber loop systems, future architectures and transitional strategies for evolution of local telephone network are key areas of research.

Opportunities in this department are:

- develop complex computer programs for use as planning tools in network architecture studies and to use them in planning the introduction of new services, technologies (e.g. digital, satellite) and methods (e.g. routing, dimensioning)
- carry out switching system simulations in order to determine traffic capacities and to develop possible design improvements
- investigate and exploit opportunities offered by new technologies that make possible the attachment of many new devices to the telephone network and ensure that the integrity of the existing network is preserved
- develop standards for future communication systems.

Individuals should have related experience, a good knowledge of communication systems and possible exposure to:

- subjective evaluation (human perception) of telephone connections
- engineering economics
- transmission performance
- familiarity with future possible telecommunication services
- electrical interference and protection of telecom networks.

Information Services Planning

A vast array of future home and business services are becoming possible with all digital voice and data telecommunications and our planning for the introduction of services is now at a critical stage.

Opportunities in this department are:

- planning, definition and prototyping of information based services for home and office
- market definition
- planning for packet switched and circuit switched data networks to support future home and business services

Applicable skills or experience are needed in the following areas:

- microcomputer and microprocessor technology (H/W and S/W)
- interactive remote computer applications
- electronic mail and messaging systems
- data communications network topology and access systems
- computer communications - network protocols.

Research

Research is on-going in combining advances in electronics, communications sciences, and computer sciences. Some key areas include: visual communication systems, human speech perception (both physical and psychological), speech encoding, network design, and distributed processing.

Individuals require appropriate experience in the respective work areas with emphasis on some of the following:

- real time computer software
- computer graphics
- computer communications
- data base management
- microprocessor technology
- digital signal processing
- speech acoustics
- linguistics
- market trend research.

All candidates must have at least a Bachelor Degree from a recognised university as well as several years' related experience. Preference will be given to self-motivated individuals who can really communicate communications, not only internally, but on a client liaison basis. Not only do we offer a stimulating work environment in one of the most progressive countries in the world, but a corporate compensation plan in which creativity and innovation are fully rewarded. An extensive company-paid benefit package including contributions to public hospital and medical programmes as well as a share purchase plan is also provided.

Interview expenses to London and relocation assistance to Canada will be provided.

So if a career in Canada with Bell-Northern interests you, please send a detailed resume including business and home telephone numbers and complete mailing address, no later than 6th April 1979 to:

Mrs. A. Weckwerth, Manager-Staffing, Bell-Northern Research Ltd., c/o Dept. 994, Government of Ontario, Ontario House, 13 Charles II Street, London SW1Y 4QS.

Interviews with Senior Company Representatives will be held in London during week commencing May 14th.

As these opportunities will also affect your family's lifestyle, your spouse is invited to attend an informal presentation on the day of the interviews, subject, of course, to selection. Detailed information on Bell-Northern Research, Canadian lifestyles, housing, education and recreational facilities will be provided at that time.

Bell-Northern Research.
Telecommunications opportunities in Canada



DP Consultant (Minicomputer Specialist) Bushey £7000+

Rank Xerox are currently developing large scale minicomputer based decentralised applications systems for use throughout Europe. These systems will interface with new and existing applications systems on our IBM 370/158s in U.K., France and Germany and will communicate over the Rank Xerox Data Network which is being extended to support a growing demand.

The Minicomputer Specialist will be a member of a team of internal consultants based at Bushey, near Walford, and will have responsibility for advising project teams on the advantages/disadvantages of decentralisation, identifying and evaluating alternative hardware/software options and making specific recommendations to management. He/she will also interface with the Rank Xerox Data Network Group and the IBM Mainframe Technical Support Group and provide support to project teams during the development and implementation phases of their applications systems.

Applicants should have an extensive (minimum 5 years) broad based technical data processing background which includes experience of IBM operating system software in addition to experience with minicomputers.

Salary is as indicated and an excellent benefits package includes 4 weeks holiday, rising to 5, generous pension, life assurance and sickness benefit schemes, subsidised staff restaurant, active sports and social club, and, where appropriate, relocation expenses.

For more information on this particularly interesting career opportunity, contact Jack Kennelly at Rank Xerox Limited, Phoenix House, High Street, Bushey, Herts. Tel: 01-950 4080.

RANK XEROX

COMPUTER SCIENCE GRADUATES

Up to £8,085

International computer company requires Technical Systems Analysts, to join small team responsible for Operating-Systems-Software in a large computer complex based in Central Scotland

01-409 1381

PLEASE JUST LISTEN
YOU DO NOT NEED TO SPEAK



**Computer Data
Processing
Limited**

EXPERIENCED OPERATORS and CONTROL CLERKS

Salary - £4,400 (with review in June)

Once again our expansion plans - which include the installation of an ICL 2872 in this summer - require us to recruit experienced operators and control clerks.

Our present configuration consists of an ICL 2880 plus 2 x 4/72s.

If you would like the opportunity to work with one of the most efficient Operations Teams in the country, please get in touch with us - we pay our staff well but we demand the best so please do not bother to apply unless you are prepared to work hard.

Three shift working is in operation and we offer four weeks' holiday after one year's service in addition to a 32½-hour week (if you could see the operators stagger out of the computer room at the end of their shifts you would understand why we have such a short working week!).

If you are good at your job and would like a fresh challenge then why not write to, or telephone:

Alan Morison
Operations Manager
**COMPUTER DATA
PROCESSING LTD.**
Oakfield House,
Pennywell Road,
Haywards Heath, Sussex
Tel. Haywards Heath 58188

ipc

Is required with proven sales ability who can demonstrate self-motivation in a dynamic front-line sales environment. This post which carries excellent commission demands a high degree of initiative and the ability to relate to a customer's technical requirement in the field of Data Communications.

Who are interested in utilising their engineering experience and knowledge of Data Communications by working on advanced Integrated Digital Networking Systems are also required. In addition to their Communications experience in Hardware or Software they must be able to demonstrate a flexible approach to technical solutions in a consultancy atmosphere.

**SOUTH WEST
ENGLAND**

These positions offer an outstanding opportunity to participate in the initial stages of a planned growth environment by working in a small but professional team. In addition to excellent salaries and company cars, a comprehensive benefits package will be available. For more details on these positions please contact Douglas Woodward on the number below or on Crayford 527062 after 7.30 p.m. or at Weekends.

SPAN

COMPUTER PERSONNEL
2 Hobart Place London SW1W 0HU Telephone 01-235 3215

ata Computer Recruitment

EXPLORATION DATA PROCESSING UK CONTINENTAL SHELF

A major oil Company wishes to appoint a number of Computer Professionals to their Exploration Data Processing Department.

Senior Database Programmer	to £12,000
Database Programmer	to £9,000
Seismic Programmer	to £9,000
Systems Programmer	to £9,000
Graphics Programmer	to £9,000
Junior Seismic Programmer	to £7,500
Junior Systems Programmer	to £7,500

The salaries offered are completely negotiable and are supported by an excellent benefits package. Candidates with relevant experience are invited to submit a Curriculum Vitae to Mr. G. W. Fox, Managing Director, ATA Computer Recruitment, 230 Great Portland Street, London W1N 5HG. All applications will be processed in strict confidence. Company employees have been informed of this advertisement.

SOUTHAMPTON (0703) 37555

LONDON (01) 637 0781	MANCHESTER (061) 832 5856
BIRMINGHAM (021) 643 1994	BRISTOL (0272) 211035
EDINBURGH (031) 226 5381	CRAWLEY (0293) 514071

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**Next Week in
Computer Weekly**

MYRIAD

PROJECT RESPONSIBILITY IN A PROGRESSIVE ENVIRONMENT

Our client, a highly successful commercial group are now keen to appoint additional staff to augment the computer systems development effort for the divisions within the group. Current hardware comprises an IBM 370/138 using Teleprocessing and Database facilities, and a PDP 11/34 is currently being installed to provide for future requirements. The group has a wide range of commercial interests and as such can offer many areas of interesting applications.

SENIOR SYSTEMS ANALYST

**NORTH WEST LONDON TO £8000
(including bonus)**

If you have a proven record as a systems analyst and feel the need to enter a more challenging environment in a senior role then this is the opportunity to effect real project development control.

Ideal candidates will have progressed from a programming background and will have developed and implemented at least one significant commercial system.

The successful candidate will need to be self-motivated and will be expected to assume control of assigned project development.

PROGRAMMER/ ANALYSTS

**NORTH WEST LONDON AND W1
TO £7000
(including bonus)**

These positions will appeal to programmers or programmer/analysts who are able to design and program systems with the minimum level of supervision. A strong commercial programming background is essential and mini-computer and BASIC experience an asset. Training will be supplied where required and successful applicants can look forward to becoming quickly involved in working with new techniques and making a strong contribution to the computer development effort.

In addition to a generous starting salary the group offers an attractive package of benefits with a project bonus scheme currently in operation. Career development prospects are excellent and are in line with a progressive business organisation. Ref: NW1/0803

MYRIAD APPOINTMENTS LIMITED
30 Fleet Street London EC4Y 1AA
01-353 0981

This Week's Specials

JUNIOR PROGRAMMERS

£3,000 to £4,300 S.E. ENGLAND

You have only 1 year's commercial experience? Then you are in great demand. We have a large selection of first-rate companies who need people like you. Some offer mortgage assistance to the right candidates after short period with them. CW 10/2 TRICIA

PROGRAMMERS, S/As & PROJECT LEADERS

£4,000 to £7,000 ENFIELD

Why not join an important stable Transport company with the latest H86 computer? All commercial work is now using the latest DATABASE techniques and on-line enquiries are handled from a multiplicity of locations, using Level 8s and other minis. If you have COBOL experience on any byte computer then please apply now. CW 10/3 MICHAEL

SENIOR OPS/ SHIFT LEADERS

£4,500 to £8,100 inc NR. FELTHAM

Would you like to work on the latest IBM 3030 machines? If you have good MVS experience and know JCL well, then this top grade Manufacturer and Service Bureau would like to see you. Tip-top perks and paid overtime. CW 10/12 TRICIA

OPERATOR/ DATA CONTROL

to £4,800 inc CROYDON

A small insurance company require an operator with 1 year's experience on ICL 2903/4. Only 1 shift system to start with on its new ICL 2904. Holidays of 4 weeks plus LVA. CW 10/13 TRICIA

DEC PROGRAMMERS

£4,500 to £8,500 LONDON & HOME COUNTIES

We now have commercial user organisations and 30 Software/Consultancy firms looking for DEC Programmers with 15 months' or more experience. Why not ring us now and enquire about your chance to improve both salaries and status. RSTS or RT11 experience are added pluses. CW 10/8 MICHAEL

RPGII PROGRAMMERS

£4,500 to £7,800 VARIOUS S.E. ENGLAND

You have never been so popular! A minimum of 8 months' experience as needed. We now have vacancies in HIGH WYCOMBE, W.1. CITY, BRENTFORD, N.W.10, EAST & S.E. LONDON, WIMBLEDY, BRACKNELL, S.E. COAST, GUILDFORD & WORKING. Some companies offer relocation expenses, mortgage assistance, flexitime and bonuses. CW 10/7 MICHAEL

DATA CONTROL CLERKS

To £4,000 inc NR. CITY

A major IBM OS installation in a multinational organisation needs data control clerks to work a 2-shift system. A minimum of one year's experience required and JCL knowledge would be an advantage. The firm offers excellent working conditions, BUPA, CPS, subsidised restaurant, etc. CW 10/8 TRICIA

SCHEDULER

to £5,000 NR. WORCESTER PARK, SURREY

A chance to get off shift work for an operator with about 4 years' IBM DOS's experience. This major electrical engineering organisation has a number of posts which include a subsidised canteen and an excellent SAS club. CW 10/9 TRICIA

DEC OPERATORS

to £5,500 LONDON AND HOME COUNTIES

We now have slight vacancies for PDP operators in the following locations: the City, Central London, Epsom and W.G.C. under various shift systems. All firms offer excellent perks. CW 10/10 TRICIA

OPERATORS/SHIFT LEADERS

£3,800 to £6,200 NR. RUISLIP, MIDDLESEX

Why not come and work for a large well organised company in the leisure business? Terrific company perks including free BUPA, C.P.S. and 4 weeks holiday. All you need is ICL GII experience of one year's minimum. CW 10/11 TRICIA

SYSTEMS SUPPORT MANAGER

to £7,700 W.1

A major cloth manufacturer based up north requires a Southern based systems person to work in London at their major computer installation on user education, systems implementation and general organisation methods. Your specific computer background is not as important as your ability to organise and deal with people. CW 10/4 MICHAEL

CUSTOMER SYSTEMS SUPPORT

£5,500 + CAR C. LONDON

This major international terminal and minicomputer manufacturer requires three first-class Systems Analysts to advise, design and install a variety of Real Time applications based around Mini or O.E.M. Mainframe Computers. Excellent opportunity for advancement and top company perks. CW 10/5 MICHAEL

JUNIOR AND SENIOR CONSULTANTS

£8,500 to £12,000 CENTRAL LONDON

Six large, well-established consultancies wish to recruit systems people with all-round experience on third generation equipment and the right personality to deal with clients who require first-rate service. Technical Communications Consultants are also required where in-depth implementation experience of IBM or DEC latest ranges are essential. Excellent fringe benefits and prospects. CW 10/1 MICHAEL

FREELANCE PROGRAMMING VACANCIES

U.K. to £300 PER WEEK

ICL 2903	COBOL	BRISTOL	1 MONTH
ICL 2903	COBOL	G. LONDON	6 MONTHS
IBM	COBOL, DGS	PETERBOROUGH	6 MONTHS+
IBM	NR IV OS	G. LONDON	3 MONTHS+
VERTEK	DATAPOINT	G. LONDON	6 MONTHS

OVERSEAS to £400 PER WEEK

IBM	COBOL, DGS OS	SAUDIA ARABIA	6 MONTHS+
IBM	DLI DGS DGS	PARIS	1 YEAR
ICL	VMEK SPECIALIST	FRANCE	1 YEAR
ICL	LOW LEVEL ASSEMBLER	BRUSSELS	6 MONTHS

Ring IRENE on 01-995 4148

UCR Recruitment Consultants
UNIVERSAL COMPUTER ASSOCIATES LIMITED

01995 3883 (01958 6138 Evenings)

Data Express House, 3 Prospect Place, Heathfield Terrace, Chiswick, W.4

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of vacancies to suit you
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The best CHOICE of
Computer Appointments
CHUCKY 129 Cannon St.
LONDON, EC1
Tel. 01-626 0171

JOHNSON GROUP CLEANERS

LTD.

requires a

COMPUTER OPERATOR

An opportunity has arisen, due to the expansion of two shift working, for a senior operator with three years' plus experience of ICL 2903/4 or 1800 machines. If you have a good knowledge of I.C.L. values and feel you could handle a shift on our rapidly expanding 2913 then we want to hear from you. SALARY CIRCA £3800

Contact: Mr. L. P. Clarke, Johnson Group Management Services, Midway, West Brompton, W6 6EW. Tel. 081-933 6161, ext. 244

DE HAVILLAND COLLEGE

The Campus Welwyn Garden City Herts

HEAD OF DEPARTMENT OF COMPUTER STUDIES

(GRADE III)

Applications are invited for the above post, based at Elstree Way, Boreham, Wood, which becomes vacant from 1 May 1979.

Applicants should be graduates with wide industrial computer and teaching experience, and preferably a teaching qualification.

Further particulars and an application form from the Principal at the above address, to be returned by Monday, 19 March.

WE ARE LOOKING FOR HIGH FLYERS...

RPGII PROGRAMMERS SOFTWARE SPECIALISTS

RENDECK ARE TAKING OFF IN THE UNITED KINGDOM

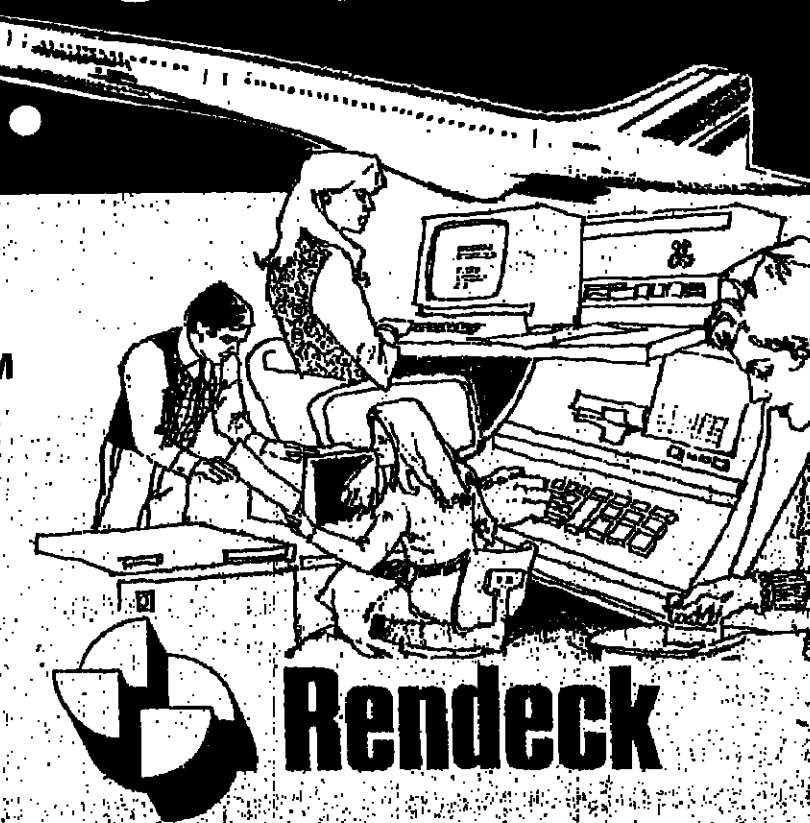
We are an international group of companies with a reputation for top quality computer systems development. The budgeted turnover is £4 million with a staff of 140. The further development of our existing UK company is the major expansion area planned for 1979. The experience gained in the United States and Europe will help ensure we fly in the right direction.

YOUR CAREER TAKES OFF WITH RENDECK

Right now we need top-class RPGII PROGRAMMERS, preferably with sound experience of Financial and Insurance systems. We also have a need for SOFTWARE PROGRAMMERS with at least 3 years' REAL-TIME experience, to work on projects in the Home Counties, South Coast and London.

We realise the worth of top quality people so the rewards we are offering will also be sky-high.

TAKE OFF TODAY: CONTACT
Bridget Kitchie, RENDECK LTD, 100 New Bond Street
London W1Y 9LF. Telephone: 01-629 5438/6088



3 Past Employee		From	
Position		Date Joined	
TYPE OF INSTALLATION			
Commercial		Bureau	
Manufacturing		Banking	
		Insurance	
		Education	
		Scientific	
		Engineering	
HARDWARE		OPERATING SYSTEM	
Software or Packages			
On-Line		Real Time	
R.J.E.		Tele Processing	
		Time Sharing	
		Data Base	
APPLICATION AREAS YOU HAVE BEEN INVOLVED IN			
Cost Accounting		General Ledger	
Budgeting		Credit Control	
Forecasting		Order Processing	
Corporate Planning		Marketing	
Sales Ledger		Distribution	
Purchase Ledger		Traffic Analysis	
		Manpower Planning	
		Stock Control	
		Production Control	
		Petrochemicals	
		Linear Programming	
		Simulation	
		Personnel	
		Payroll	
		O.R.	
		Radar	
		Statistics	
Projects Completed		Responsibilities	
PLEASE CHECK THAT EACH SECTION HAS BEEN TICKED APPROPRIATELY			
ADDITIONAL INFORMATION			
General			
Data Processing			
Terminals			
Software/Packages			
Application Areas			
Projects and Responsibilities			

MYRIAD

PROGRAMMERS

NEW MINICOMPUTER & MAINFRAME DEVELOPMENT

W. LONDON

Our Client a highly successful commercial group based in West London is now embarking on a new phase of project development utilising mini-computers linking a country-wide system network. Currently therefore they are able to offer programmers a real opportunity to stay at the forefront of computer systems development into the 1980s.

Successful applicants who can offer at least eighteen months' commercial COBOL programming experience from either a mini or mainframe background will be given the scope to become fully conversant with on-line, distributed processing and database techniques. Where required technical training will be supplied to enable successful candidates to contribute effectively to this important project development.

c £6000

The group can offer a very favourable benefits package with competitive starting salaries and attractive bonus scheme as well as all the facilities offered by a large employee conscious organisation.

MYRIAD APPOINTMENTS LIMITED
30 Fleet Street London EC4Y 1AA
01-353 0981 24 HRS.

SENIOR SALES EXECUTIVES RETAIL SYSTEMS EARNINGS: £12-£15,000

The company is one of Europe's leading suppliers to the retail sector, having a product range which incorporates mainframe and mini-computers, as well as specialised terminal equipment.

To further enhance its strong position in the retail sector, the company will now appoint three experienced sales executives at senior grades. These people will have a solid sales track record to their credit, having earned their spurs selling mini-computers, intelligent terminals, small mainframes or services. Knowledge of retail applications, such as Point-of-Sale, would obviously be an advantage, but it is not essential. The earnings package will be negotiated according to experience, but you can expect to earn at least £12-£15K in your first year, including a basic salary of not less than £8,500.

Contact: TONY BAKER, 01-499 4501 (24 hour answering service) during business hours. Or 01-445 3512 at other times.

REF. RW 10/1

MINI-COMPUTER SALES

P.E. £15,000
+ Car

My client — a well-known and respected mini-computer manufacturer — wishes to engage one senior sales executive to handle National Accounts.

The product is already to be found in many large-scale T/P networks, and the job will be to enlarge the company's penetration in this highly lucrative and growing market.

A sound track record is essential, probably earned in mainframe account development selling. Candidates will have a mature approach, coupled with a sound technical and commercial grounding. Location is not important, but there is a slight advantage in being resident in the South-East.

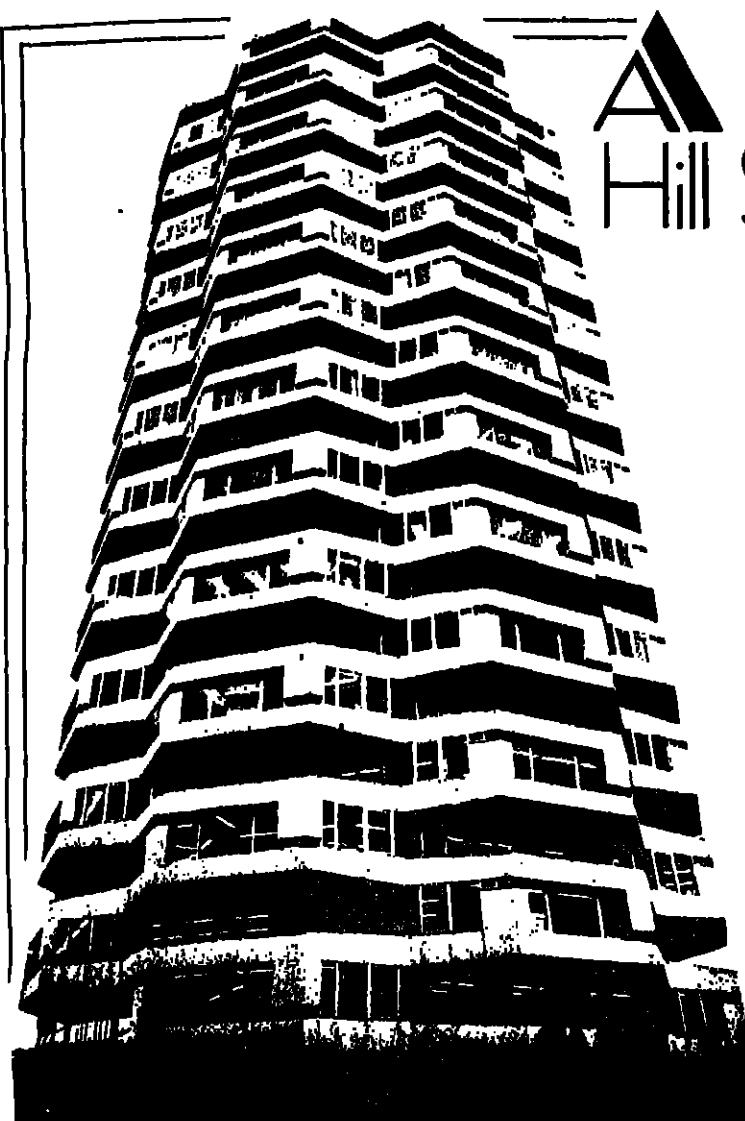
Contact: TONY BAKER, 01-499 4501 (24 hour answering service) during business hours. Or 01-445 3512 at other times.

REF. RW 10/2

hutchinson-scoggins recruitment
47/48 New Bond Street (entrance in Maddox Street)
London W1Y 0HE Telephone 01-499 4501

Management and Executive Selection

"We'll Help You Find the Needle—
We Know the Haystack!"



A PLACE TO GROW Hill Samuel Life Assurance Croydon

You will have the opportunity to grow if you have the skills and ability. H.S.L.A. provide the place and now they want the people. A developing D.P. environment, expanding into new technology and diversifying into new application areas requires people who can identify and solve problems sensibly and effectively. All these jobs offer a clear, established career path, which provides job satisfaction and increasing rewards.

SENIOR ANALYST & SYSTEMS ANALYST £6,600-£8,000

We want people who will do a good job immediately and who have potential to move into more senior positions in the department. Although technical skills are important, personality, commonsense, intelligence and an enquiring mind, coupled with the ability to get on well with users, is essential.

We naturally look to the Senior Analyst to have more experience — three years as an Analyst with the completion of a major project capable of accepting responsibility for large systems as a Project Leader and of implementing to time and budget.

The Analyst will lead, initially, smaller projects and will have successfully specified and implemented at least one system.

Both positions require a programming background and experience of insurance systems, whilst not mandatory, is advantageous.

The picture shows the NLA Tower, the modern air-conditioned office block which houses the data processing department of Hill Samuel Life Assurance. The company is fast growing, specialising in annuities, life assurance and unit-linked pension plans. HSLA is a part of the Hill Samuel Group which has extensive interests, primarily in the Banking and Insurance sectors. HSLA uses an IBM 370/158, operating under OS MVS with both batch and interactive systems live. An IBM 3790 is on order to provide distributed processing facilities and on-line program development under TSO will commence in 1979.

ANALYST/PROGRAMMER Circa £6,000

This position is for a Trainee Analyst who has three years IBM COBOL experience including program design. With training the Analyst/Programmer will take control of small applications and existing system enhancements and will complete to time and budget.

PRODUCTION CONTROLLER £3,500-£5,500

To accept responsibility for production systems from control of input data to distribution of output, communicating with users and trouble-shooting if problems arise. Control of terminal operations and close liaison with the computer facility are required.

Experience will include an operations background, preferably with previous production control and JCL involvement on a large IBM 370 under OS.

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(b) ASSISTANT O & M OFFICER £4880-£5087 p.a. Incl (Ref. No. 1C/17CW)

Are you the person to tackle a wide variety of problems, applying systems and supporting these with a 4th Generation computer? You would work within a small group actively engaged on all aspects of Management Services associated with the identification and satisfaction of the Council's needs overall. Post (a) will play a major support and occasionally lead role, whilst post (b) will provide the supporting role on projects involving feasibility, research, systems design and implementation. For both posts a degree and/or Business Studies qualification is preferred together with proven training across/within the areas of Computer Systems, Information Systems, Nature and Role of Information, with practical and working experience.

For application form please telephone our 24-hour recruitment answering service 01-437 8888 or send postcard to the Chief Executive, London Borough of Camden, Town Hall, Euston Road, London, NW1 2NL, stating post and appropriate reference number.

Camden — an equal opportunity employer

Applicants are considered on the basis of their suitability for the post regardless of sex, race or marital status. Any registered disabled persons with the necessary attributes are welcome to apply.

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- Swindon and the South Midlands including Gloucester and Oxford.
- The Bristol area.

These are permanent positions which will attract personnel living in the above areas where the following situations apply:

- Programmers of approximately three years' experience on mainframe machines using PLI, COBOL or ASSEMBLER.
- You wish to work on new applications and learn new techniques.
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We are Associated Container Transportation Services and operate world-wide through container services on behalf of five major shipping lines. Recently we have installed a Burroughs B6700 computer with an on-line Database system to supplement and eventually replace our existing Honeywell 2080, and to create even more efficient handling of container documentation.

We now require Computer Operating staff to work with both of these installations. The job is a challenging and stimulating one and, if you have already obtained large systems experience, preferably with Burroughs equipment, we would like to hear from you.

Our Southampton offices are modern and air-conditioned, and relocation expenses will be paid where appropriate. Salaries of either £3433 + 20% shift allowance of £3824 + 20% shift allowance will be dependent on experience. The company offers, in addition to salary, an attractive range of fringe benefits which includes luncheon vouchers, flexible working hours and company pension plan.

For further information or an application form please write or telephone: Mrs. L. Lishey
Assistant Personnel Officer
ACT Services Ltd.
Richmond House
Terminus Terrace
Southampton SO9 1GC

Telephone: Southampton (0703) 34433

MYRIAD

OPERATIONS
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A major international organisation, well known as the market leader in its field, has recently installed dual 3Mb ICL 2960 computers and is now seeking to strengthen its Operations Support team. This has created a number of outstanding opportunities for experienced ICL 1900 operations/scheduling/support personnel, who wish to move OFF-SHIFT, and become involved with one of the most sophisticated 2900 sites in London.

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The successful candidates will be able to offer a sound background in GEORGE II/III JCL, macro's and 1900 utilities. They will become involved with the development, implementation and support of production systems, including writing VME/B SCL, for which full training will be given, and will provide a consultancy service to the operations and data-control teams in the case of operational failures.



City of
Nottingham

City Treasury

The City Council have an ICL 1903A computer which is to be replaced by an ICL 2980/2MB in October 1979 to allow a substantial expansion of services over the next few years. The on-line program development service to be provided by the staff establishment has been reorganised and enlarged and the following vacancies are to be filled:

Senior Programmers

S01/2 £5,232-£6,060 per annum including supplement

Applicants should preferably have at least 3 years' experience of programming in PLAN and COBOL and be capable of leading a small team of programmers in development, conversion and maintenance projects. Relevant qualifications will be an advantage.

Programmers

G.1 - AP.5 £1,656-£3,073 per annum including supplement

Applicants should preferably have at least 1 year's experience in PLAN or COBOL. The starting salary will depend on experience and qualifications.

Assistance with housing accommodation and payment of removal expenses, lodging allowances or travelling allowances may be provided in approved cases for either of the above posts. Appropriate training for 2000 will be given. Further details may be obtained if required by telephoning Mr. Farmer (0602 48571, Ext. 123). Applications with the names and addresses of two referees should be forwarded to the City Treasury, Guildhall Nottingham NG1 2DE by 23rd March, 1979. Please quote ref. CT/1830/1.

MANAGEMENT &
EXECUTIVE SELECTION

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Our clients wish to appoint more Systems Designers, Software Engineers, and Programmers for development work on Real-time Control Systems.

Applicants for senior appointments should have relevant experience, whilst at the less senior levels ability to use the languages and understand systems will suffice.

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RPGII (+COBOL & Honeywell 62)	W.1	to £7½K + car
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UNIVERSITY OF EDINBURGH
RESEARCH ASSOCIATE
PART-TIME PROGRAMMER

Required by the Tourism & Recreation Research Unit.

Applicants should possess experience in IMP or ALGOL. The work will involve the assembly and preparation of various survey data sets and map frameworks, as well as the production of statistical and spatial analyses using standard packages and special purpose programs.

Starting salary will be (pro rata) on scale £3,365-£4,862, under review. Further particulars may be obtained from TRRU, High School Yards, Edinburgh, EH1 1HR. Telephone 031-668 3871. Applications should include CV, details of relevant experience and names of two referees and should reach the Unit by March 23rd. Please quote Reference 5010.

NORTH WESTERN REGIONAL HEALTH AUTHORITY
COMPUTER SECTION

SHIFT CONTROLLER

Salary £4,869-£8,025 per annum

Applications are invited from experienced computer people to this post in the operations section.

The person appointed will have supervisory ability and experience of controlling and scheduling the processing of data and must be prepared to work on a shift rota basis for which additional allowance of 15% of salary is payable. The shift does not involve overnight or weekend work.

Application forms and further details from Regional Administrator, North Western Regional Health Authority, Gateway House, Piccadilly South, Manchester M60 7LP, or by telephone information telephone Mr. R. Dyson on 061-773 9211. No quote reference number 1740A. Closing date 22nd March 1979.

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Data Logic is one of the country's most successful, and fastest growing, systems companies. Our product markets include terminal and distributed systems, word processors and data communications equipment. Our target is to more than double turnover over the next five years.

Our Customer Engineering Division provides the nationwide field service our users expect. Its staff deal with hardware and software, with a wide range of state-of-the-art products, and with a diversity of user environments. The work is challenging, placing a high premium on initiative and experience.

Systems
Engineer

The rapid growth of the Division has created the need for a Systems Engineer (ref CE/1) to provide specialist support to the field service force. He or she will have a degree in electronic engineering or computer science, followed by at least three years in a specialist support role with a mainframe manufacturer. This is an important new role within the Division, providing considerable career scope for an energetic and able individual.

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Engineer: Oxford

We are looking for a Field Service Engineer (ref CE/2) to provide preventive and corrective maintenance at user sites in the Oxford area. He or she will have previous experience servicing computers and associated peripherals. An ONC or HNC in electronics or computing is desirable, but not essential. Whilst the position will clearly be of interest to engineers living in the area, relocation expenses will be paid should the successful candidate wish to take the opportunity to move to Oxford from elsewhere.

Both positions will attract an excellent salary and benefits, and a company car.

**Data
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Write or call, quoting the appropriate reference number: Kathy Martin,
Data Logic Limited, 29 Marylebone Road,
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£5000-£7000

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201-6 Albany House

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WEST COUNTRY BRISTOL PLAN PROGRAMMER to £6,000 p.a.

Our clients are a well-established company based in Bristol and require an experienced PLAN Programmer. The position involves the support of client systems and the tailoring of packages to suit individual client requirements. The successful applicant will also be given thorough training in BASIC as it is envisaged that he/she will also be involved in the development of mini/micro computer applications.

For further information ring 0272 211035

CUSTOMER SUPPORT OPERATIONS to £7000 p.a.

The successful applicant will be fully conversant with the problems and solutions of conversion from 1800 series to 2800 series under VMSE.

Ideally he/she will also have had experience of liaising with users and be able to communicate effectively not only to D.F. staff but also non-computer orientated personnel.

PRE & POST SALES

£6000 + Car allowance

A Systems Analyst is required to provide pre and post sales support for a mini manufacturer. The ideal candidate will have an all-round commercial background, preferably with RPG II programming experience. The salary is negotiable circa £6000. In addition a tax free car allowance of £804 pa and mileage rate is payable plus a discretionary bonus.

For further details ring 0272-211035
or alternatively write enclosing
detailed curriculum vitae to

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Programmer

N. London, to £6,000

This major international manufacturing company intends expanding the DP facilities at its North London Head Office and is currently evaluating new equipment to replace the heavily overloaded IBM 370/115. TP and distributed processing feature prominently in the plans. In anticipation of these developments a new position has been created for which we require a

young enthusiastic programmer ideally with two or more years COBOL experience. The successful candidate will immediately become involved in the redevelopment of existing applications designed to achieve a fully integrated system. Career prospects are excellent with this progressive organisation and there is an attractive range of fringe benefits.

E. Sutton, Ref: 17057/CW

Male or female candidates should telephone in confidence for a Personal History Form to:
LONDON: 01-734 6852, Sutherland House, 5/6 Argyll Street, W1E 6EZ.

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— Home Counties

Our client is a multi-national high technology company willing to pay over the odds for someone with around 2 years RPG II experience.

The machine: a shortly to be upgraded 48K IBM System 3/10 with Memorex 660 discs and 750 lpm printer, diskette input.

Applications: general accounting and commercial. Knowledge of system design, analysis or software advantageous but not vital.

In addition to a generous salary, our client offers good BUPA life insurance, pension plan and, if necessary, relocation expenses — plus lunch allowance.

Apply, quoting ref. C/1664 to Roly J. Burke on 01-903 9477 or write to Aplin Phillimore Limited, Circle House North, 6971 Wembley Hill Road, Wembley HA9 8BL.

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LECTURER GRADE II in COMPUTER STUDIES

Applications are invited from suitably qualified persons for the above post, which is tenable from 1st May, 1979.

Further details and application forms, returnable within 14 days of the appearance of this advertisement from the Principal, Stevenage College, Monkwood Way, Stevenage, Herts SG1 1LA.

Software Designers & Senior Programmers

North London to £7000

Our client, part of a large multi-national group, is currently developing a new range of highly sophisticated communications equipment.

The equipment is built around a new central communications processor and uses microprocessors as control units for the peripherals.

They now need Software Designers to take responsibility for the detailed design of the new operating system and its applications software and Senior Programmers to control and participate in its development. Successful candidates can expect to be closely involved with users, hardware engineers and OEM suppliers in developing this exciting new project.

Suitable candidates will possess in excess of three years experience in specialist software development and have gained some experience in I/O and file management techniques. Experience in working in a small project team environment is desirable. Essential is solid experience in an Assembler level language and a good knowledge of technical systems design.

Ideally, candidates will be aged 22-28 with a degree and have the presence and ability to liaise with the various interface points both within the company and outside.

The company offers a good range of benefits which includes full relocation and temporary accommodation if necessary.

To discuss these opportunities in more detail telephone Monks Holiday or write in strictest confidence quoting reference MGH 2125.



Lloyd Chapman Associates

123, New Bond Street London W1Y 0HR 01-408 1670

Senior Analysts and Programmers

Hampshire to £7,000

Plessey Management Services has a small number of vacancies for experienced Systems Analysts and Programmers, within both the Company's Central Development team and its Regional Systems Development team. Projects currently encompass financial, production, engineering and commercial systems, utilising batch processing, on-line, and database techniques.

The development and support teams have access over the Plessey network ICL 1906S and 1906A machines at the Plessey Computer Centre. Plans are in hand for the introduction of 2900 mainframes. Additionally, diversification into distributed processing, based on 2900, various minis and word processing configurations, is also planned.

Both departments are located at Titchfield, in attractive rural Hampshire, which offers easy access to the recreational facilities of the countryside and the South Coast, yet is close to all the amenities offered by Southampton and Portsmouth.

Applicants should have at least 2 to 5 years EDP experience in manufacturing industry, ideally including COBOL, Fortran, George J, and on-line or transaction processing.

Salaries will start in a range between £5,000 and £7,000. There is a first rate benefits package, including relocation expenses where appropriate.

For further information and an application form, please ring or write to Mrs. L. J. Dawson, Personnel Officer, The Plessey Company Limited, 2-60 Vicarage Lane, Ilford, Essex. Tel: 01-478 3040 Ext. 3051.

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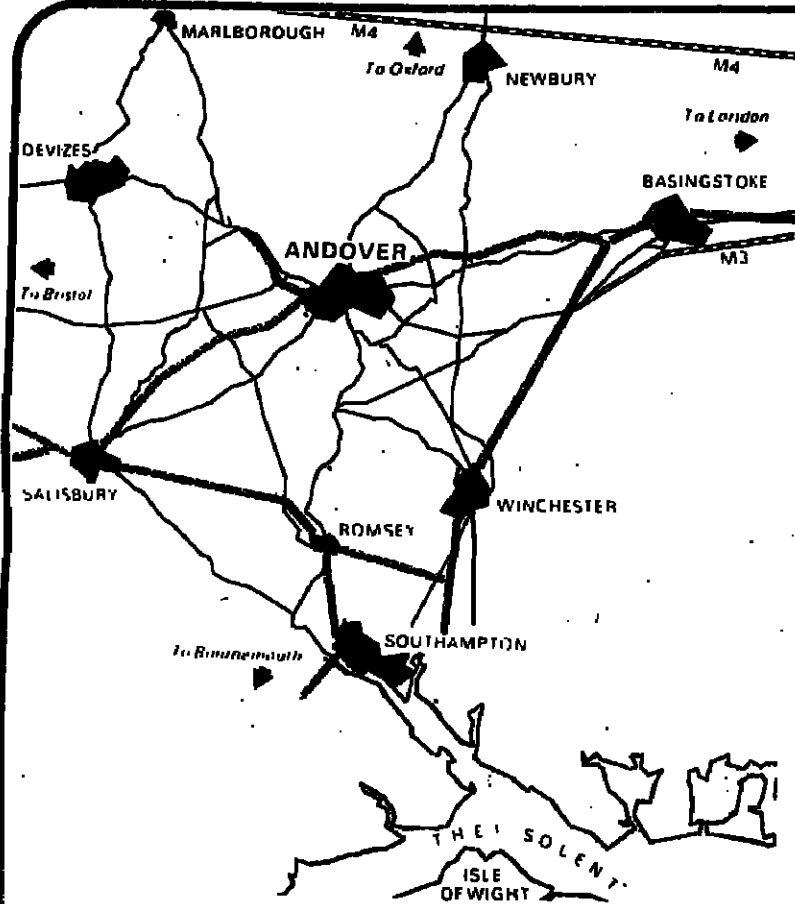
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Monday 12th or Tuesday 13th March any
time between 10 a.m. and 8 p.m.

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INFORMAL
INTERVIEWS



TSB Trust Company Limited

THE COMPANY

A large and expanding Life Insurance and Unit Trust company, part of the TSB group, committed to using sophisticated systems as the prime tool for operating and managing the company. The purpose built head-office at Andover (surrounded by lovely Hampshire countryside) has a Burroughs B6800 machine - recently upgraded from B3800 - and development of integrated insurance systems is well underway. The database system being utilised is the DMS2 with real-time transaction processing on a VDU terminal network planned. Unique development opportunities exist for computer professionals to become involved in advanced systems.

THE BENEFITS

A stimulating career in an expanding, prestigious company, where individuals matter, particularly in terms of career objectives and personal achievement. The following features are part of the employment package which substantially increase gross salary figures:

- A competitive salary on a rising scale;
- Mortgage subsidy;
- Non-contributory pension scheme;
- Free Life Insurance and permanent health scheme;
- Generous relocation expenses.

PROGRAMMERS up to £5,000 + benefits

At least 18 months COBOL programming experience is required, ideally gained on systems incorporating real-time terminals and, preferably, a database. A background on Burroughs equipment will be an added bonus. Programmers who are appointed will receive training and the opportunity to diversify experience on a variety of applications as their career develops.

SENIOR PROGRAMMERS up to £6,300 + benefits

Candidates for these positions will have a number of years experience of programming on real-time terminal systems in COBOL. Particular experience on insurance, banking or financial applications will ensure serious consideration as will a knowledge of Burroughs equipment. Successful candidates will assume a high degree of responsibility, after any initial training, and opportunities will exist for wide diversification. A knowledge of ALGOL will be useful for some vacancies.

SYSTEMS ANALYSTS up to £6,000 + benefits SENIOR SYSTEMS ANALYSTS up to £7,200 + benefits

Systems Analysts with a track record on insurance or financial systems development will be particularly suitable. The company is dedicated towards terminal network processing with DMS2 and previous work in this type of system is very desirable. A programming background is not essential but deemed necessary for some of the vacancies. Successful applicants will assume project responsibility within a short time, depending on the personal ability and skill of the individual.

For further information, please contact:
Mike Creamer

JAMES BAKER ASSOCIATES
International Personnel Consultants
16 Maddox Street, London W1
Tel: 01-491 4478

JBA

Data Processing Manager

Major Insurance Company Surrey
CIRCA £12,000 plus CAR and substantial benefits

Our client is a well-known insurance company whose administrative Head Office is located in mid-Surrey. The Company handles all classes of insurance through 50 branches located throughout the U.K. and many other offices located in other parts of the world.

The existing Data Processing Manager is shortly to be promoted and the Company wishes to recruit a replacement.

The Department has a staff of over 100 and operates an IBM 370/145 which will shortly be supplemented with a 3031. Current systems support a large number of local and remote terminals. A countrywide Distributed Processing Network is under development.

The new Data Processing Manager will be expected to control all aspects of operations and systems development. Our client expects to recruit a thoroughly experienced, professional Manager, to control a fast growing and forward thinking department.

Experience in the insurance or financial sectors and with IBM equipment is preferable, but not a prerequisite.

The successful applicant must be able to demonstrate the ability to manage a department with an operating budget approaching £1 1/2 million.

The position offers very substantial benefits including:

- ★ Subsidised Mortgage Scheme
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- ★ Attractive Pension, Permanent Health and Life Assurance schemes
- ★ 23 Days' Holiday
- ★ Relocation Expenses (where appropriate)

Applicants should apply to Michael Sands by sending a comprehensive curriculum vitae.

Ref. 2291/CW.



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ANALYSTS & PROGRAMMERS



Systems Analysts and Programmers are required for this expanding Data Processing Department. Analysts should have a Commercial Systems background, and a knowledge of Accountancy based systems would be an advantage. There is a high degree of development work involved in this batch and on-line environment. Opportunities exist for rapid advancement in both Project Leadership and other areas. Our clients have always been interested in recruiting top calibre staff to join their professional team and consequently will be interested to hear from Junior Analysts or Programmers wishing to move into Systems.

ICL COBOL and PLAN Programmers are also required to work both in a Technical Support function and in general application areas. In both cases a well defined career structure is offered and, as your career and experience progress, you will be given every opportunity to move into the area that suits your abilities.

Our clients are an International Corporation with their Computing Headquarters on the North London/Hertfordshire borders.

The company utilise ICL 1900 hardware running under GEORGE II+, software includes COBOL, PLAN and DATADRIE.

Our clients consider it important, in their commercial environment, that Programmers and Analysts specialise in their own fields and are consequently well rewarded by both high salaries and job satisfaction.

Starting salaries in both grades will be up to £6,700 p.a. but incremental scales rise to over £8,000 p.a. for the same positions.

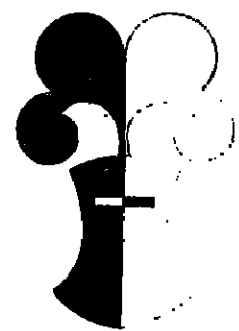
In addition to the salary structures, there are many other interesting benefits including: Advantageous PENSION and LIFE ASSURANCE schemes, STAFF SHOP offering large DISCOUNTS on goods, SUBSIDISED CANTEN, FREE CAR PARKING, SPORTS & SOCIAL CLUB.

For more information on these posts please contact ANJELA WALSH at the number shown below.

SPAN COMPUTER PERSONNEL 01-235 3215

2 Hobart Place London SW1W 0HU

01-235 3215



NORTHERN OPPORTUNITIES



SYSTEMS DESIGNER MANCHESTER

COMPANY CAR offered. Five years' experience, to work on MICROS, assembler knowledge with a commercial background required.
Ref. 1098

SENIOR SYSTEMS ANALYST LEEDS

ICL experience an advantage, lucrative self-financing productivity payment and relocation expenses are offered.
Ref. 1073

JUNIOR PROGRAMMER SOLIHULL

18 months' programming experience in any language is required by our client. CAR allowance offered.
Ref. 1099

SYSTEMS ANALYST STAFFORDSHIRE

Our client requires analysts of varying experience from approximately one year upwards.
Ref. 1095

OPERATIONS PLANNING ASSISTANT STAFFORDSHIRE

Experience in IBM OS/VS is required by our client for this technical support role.
Ref. 1092

COBOL PROGRAMMER CHESHIRE

Three years' programming experience required. To work on IBM 370 under OS/VS1 in expanding data centre.
Ref. 1091

SYSTEMS PROGRAMMER MANCHESTER

Two to three years' experience in OS/VS1 IMS/VS and DB/DC is required by our client.
Ref. 1085

JUNIOR PROGRAMMER MANCHESTER

Minimum working experience of 6 months COBOL is required by our client. Commercial environment. General benefits offered.
Ref. 1083

SYSTEMS PROGRAMMER STAFFORDSHIRE

Software involvement, experience in assembler, JCL, OS and VS an advantage.
Ref. 1093

FOR DETAILS OF THESE AND OUR OTHER VACANCIES PLEASE CONTACT JOAN JOHNSTONE
143/144 ROYAL EXCHANGE, MANCHESTER. TELEPHONE NO. 061-833 9341/5
DATA PROCESSING RECRUITMENT SPECIALISTS



SCIENCE RESEARCH COUNCIL COMPUTER PROGRAMMERS FOR SPACE RESEARCH

APPLETON LABORATORY has vacancies for COMPUTER PROGRAMMERS to work on data processing and control in support of a major international Satellite project, the Infra Red Astronomy Satellite (IRAS), which will be launched in February 1981. The Science Research Council has the responsibility for providing the satellite control centre and a scientific data analysis centre for this project which is a collaborative venture with the United States and The Netherlands. The main computers that will be used are two PDP 11/35 machines and a large ICL mainframe. Programmers are needed in the following areas:

- real-time software
- large-scale data base handling
- orbit and attitude analysis
- scientific data processing

Posts will be available at both Scientific Officer and Higher Scientific Officer level. Applicants should have a degree, HND, HNC or equivalent qualification in Science, Mathematics or Computer Science, with at least two years' programming experience for the higher posts. The posts will initially be located at Ditton Park, Slough, but will probably be transferred later to Chilton, Oxfordshire.

Salary will be on the following scales (Outer London Weighting Allowance included), the exact step depending on qualifications and experience: £4378-£5723 for an HSO or £3114-£4680 for an SO.

Non-contributory pension scheme.
Please request an application form from:
The Secretary
Science Research Council
Appleton Laboratory
Ditton Park, Slough SL5 9JX
Tel: 0494 44234, Ext. 153
Closing date: 5 April, 1979

Goods Inward Inspectors

required to join CTL, the British Computer Systems and Software Company at Hemel Hempstead.

We currently have opportunities for both electrical and mechanical Goods Inward Inspectors who, as part of a small team, will be responsible for inspection and acceptance of all piece part and peripheral material.

Candidates ideally will have served a recognised trade apprenticeship and have previous inspection experience. However, other candidates who are familiar with the tools of the trade and have the ability to read manufacturing drawings and specifications will also be considered.

Salary negotiable according to experience with excellent benefits and opportunity for overtime.

Please write or telephone for an application form/
further details to: Julia Rigdon, Personnel Officer,
CTL, Easton Road, Hemel Hempstead, Herts HP2
7EQ. Tel: Hemel Hempstead (0442) 3272.



The British Computer Systems and Software Company

Owing to expansion and the introduction of two-shift working the following posts have been created within our Computer Operations Department which is using an IBM 370/158 running under DOS/VS, POWER/VS, CICS and VSAM.

SENIOR OPERATOR/CONTROLLER

Ref: CW/167
From £5189 p.a. inc.
Will be responsible to the Production Controller by hour-by-hour operation of the Computer Room and Control area.

We are looking for someone with at least two years' operating experience, one of which must have been capacity of Senior Operator — a good knowledge of JCL, Work Control procedures.

OPERATOR/CONTROLLER

Ref: CW/168
From £4102 p.a. inc.
For this post we are looking for someone with a minimum of one year's operating experience. A knowledge of work control procedures and DOS JCL would be a decided advantage. Both posts have a minimum of 22 days per year and we have a subsidised restaurant and a Sports and Social Club.

The Royal Borough of KENSINGTON AND CHELSEA

Application form quoting appropriate reference number from the Establishment Officer, Dept. 151, The Town Hall, Monmouth Street, Kensington W8 7JX. Tel: 01-273 8562 (24-hour answering service). Application forms to be returned by 26th March, 1979.

The council welcomes applications from suitably qualified registered disabled persons.

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c.£6,000 WOKING

B.A.T (U.K. & Export) Limited is a rapidly increasing force in the U.K. cigarette market. We need expansion in the information services to match the expansion of our business.

Because of this rapid growth the opportunities for developing skills and for promotion are excellent. The person we are looking for is probably over the age of 23, of graduate capability and will be able to handle work involving computer systems (both in-house and bureau) and have a strong numerate capability.

As well as these abilities we need someone with an outgoing personality who is able to communicate effectively at all levels, verbally or in writing.



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Starting salary will be around £6,000 depending on age and ability.

Please write with full career details, including salary progression, to:
Miss M.T. Stone,
Personnel Manager,
(U.K. Market)
B.A.T (U.K. & Export)
Limited, Export House,
Woking, Surrey GU21 1YB.

Graduate plus two years?

If you have two years' computing experience now is the time to acquire some microprocessor expertise.

At Marconi Avionics we provide training in design techniques and CORAL. At plants in Borehamwood, Welwyn Garden City and Radlett, all in Hertfordshire, we are writing software for TEXAS, MOTOROLA and INTERSIL microprocessors and we need programmers and engineers for several small projects.

So if you are a graduate with two years' programming

or hardware experience and are interested in working with microprocessors please ring Norma Coulter on 01-953 2030 ext. 3771. Alternatively write to H.E. Batchelder, Marconi Avionics Limited, Elstree Way, Borehamwood, Herts. Please quote reference MA79017. These posts are open to both men and women.



HEAD OFFICE SENIOR PROJECT OFFICERS

£5,988-£6,438

PROJECT OFFICERS

£4,323-£4,850; £4,821-£5,181; £5,370-£5,772

All salaries plus £312 p.a. supplement.
The Authority is to replace its existing twin ICL 1904S installation running under OS with a larger 2900 by 1980/81. For this project we need computer professionals with sound experience in at least two of the following:

COBOL programming; FORTRAN programming; systems analysis and design; operating systems; systems software; communications hardware and software; operations.

The senior project officers must have at least five years' computer experience, including some at supervisory level. One of the Project Officers will be involved in the conversion of the technical systems and experience in this type of work would be an advantage.

Application forms and further details from:

The Director of Personnel & Management Services, North West Water, Dawson House, Great Sankey, Warrington, Cheshire WA8 3LW. Telephone: Penketh 4321 Ext. 64.

Closing date: 23rd March, 1979.

The above posts are open to men and women



CITY OF BIRMINGHAM POLYTECHNIC

SENIOR PROGRAMMER

(2 POSTS)

Salary: Grade APIV £4,245-£4,832 (Inclusive)
Required in the Computer Centre which operates an ICL 1902S (32K) and is proposing to install other computer equipment. A working knowledge of at least two languages and experience of Educational Computing would be an advantage.

Further details and application forms (to be returned within 14 days of the appearance of this advertisement) from: The Personnel Officer, City of Birmingham Polytechnic, F Block, Perry Bar, Birmingham B42 2SU.

THE POLYTECHNIC HUDDERSFIELD

DEPARTMENT OF COMPUTER STUDIES
AND MATHEMATICS

PRINCIPAL LECTURER — COMPUTING/INFORMATION SYSTEMS

Ref: ACA/307

The principal degree and diploma courses within the Department involve major studies of applications of computers in business, industry and public authorities. The successful applicant should have appropriate academic and practical experience to promote and lead specialised studies relevant to these courses. A good Honours Degree and/or MBSC is essential.

Staff are expected to undertake activities including research, in addition to teaching duties.

Salary: £7047-£7818 (Bar) - £8844.

Further details and application forms, which should be returned by 22 March, 1979, from the Personnel Office, The Polytechnic, Queensgate, Huddersfield HD1 3DH. Telephone 0484 22288, Ext. 2226.

BRIGHTON POLYTECHNIC FACULTY OF MANAGEMENT AND INFORMATICS

DEPARTMENT OF COMPUTING AND CYBERNETICS

Applications are invited for the following posts:

1. Reader in Computing
Candidates should have a record of successful research in Computing and be able to lead and develop Computer Research in the department.

2. Lecturer II/Senior Lecturer (two posts)
(Post 1) In Computer Science with particular interest in Programming Languages.
(Post 2) In Computer Science with particular interest in Data bases.

Salary Scales:
Reader £8073-£8844
Senior Lecturer £6051-£7572
Lecturer II £4101-£5558

For further details and application forms please apply to the Personnel Officer, Brighton Polytechnic, Moulsecombs, Brighton BN2 4GJ. Tel: (0273) 893865 Ext. 2532.
Closing date: 2nd April 1979.

CAPP ASSOCIATES group provides permanent and contract recruitment services to clients and applicants

Operators

N. London

C. £5,000

The company, an international group manufacturing and exporting pneumatic power tools, is successful. So is the data processing department, such that it is used as a reference account by the computer manufacturer.

The mainframe is the latest technology Honeywell 64/50, 512K, with seventeen terminals and 1400 MB of disc — a substantial configuration.

The requirement is for two Operators, to work with the existing two Operators, covering a day and evening shift system. Honeywell/GCOS experience would be ideal, but applicants with other experience should certainly apply. The salary is around £5,000 per annum including shift allowance, with paid overtime.

One vacancy is occasioned by a promotion into programming, indicating the possibilities for progression. The offices are in Hendon, North London, convenient for bus and the northern line tube, also close to the start of the M1. The department is extremely friendly, there is a subsidised canteen and an active sports and social club.

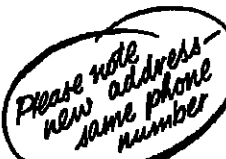
We feel we can recommend these positions, so for more details please telephone (24-hour service) for an initial discussion, write with details of experience or simply complete the coupon and send it to the address below.

Please contact me with more information regarding the operating positions in Hendon.

NAME

ADDRESS

Home Tel. No. Bus. Tel. No. (Used Directly)



Positions open to male & female applicants. QUOTE REF. CW 114.9T.



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Customer Support

more variety, challenge and reward
Hertfordshire — £3,500-£8,500

Major reorganisation of the Rank Xerox International Data Centre in Bushey has led to vacancies in our Central Customer Support Group which is responsible for supporting all aspects of our users' computer usage across Europe utilising our three computer centres in the U.K., France and Germany.

Each centre operates IBM 370/158's with OS/VS2 with a large Remote Job Processing network and a number of interactive VDU systems. Men and women are required at all levels in the three main sections of Customer Support as follows:

- Batch Systems and Interactive Systems Support**
Senior — with at least 4 years IBM OS experience and a detailed knowledge of IBM assembler.
Intermediate — with at least 2 years IBM OS experience and a knowledge of assembler or a commercial programming language.
Junior — with at least one year's IBM experience.
- For the Interactive Systems Support positions, preference will be given to those with on-line experience.**
- Training and Standards Support**
Senior — with proven ability in the area of EDP education, a detailed knowledge of IBM and experience in the compilation and control of Data Centre records.
Intermediate — with either proven ability in EDP education or IBM experience and a technical background.
- Applicants for all these demanding positions must be able to demonstrate confidence in attempting to tackle any task.**
- Trainees**
We also have a small number of vacancies for Trainees and candidates should have a good academic background and preferably some previous exposure to computing.
- Competitive salaries are in the range indicated and an excellent benefits package includes 4 weeks holiday, rising to 5, generous pension, life assurance and sickness benefit schemes, subsidised staff restaurant, active sports and social club, and, where appropriate, relocation expenses.**
- For more information on these outstanding career opportunities, contact Brian Spence at Rank Xerox Limited, Phoenix House, High Street, Bushey, Herts. Tel: 01-950 4030.**

RANK XEROX

Ref: 1091

Contract Vacancies



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IBM 370 IMS COBOL Programmers
ICL 1904 GIII Cobol/Plan Programmers
ICL 2904 Cobol Programmers
IBM 370 IMS PL/1 Programmers
Univac 1100 Assembler Programmers

YORKSHIRE

IBM 370 PL/1 Programmers
ICL 2904 Analyst Programmers
ICL 2900 Driver/Cobol Programmers

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ICL 1900 Cobol Programmers
IBM 370 Cobol Programmers
IBM 370 OS Cobol IMS Programmers
PDP11/70 Basic Plus

SOUTH

Honeywell 66 IDS Cobol Programmers
IBM 370 PL/1 Programmers
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MAJOR COMPUTER MANUFACTURER

Due to significant success and growth, our client is looking for experienced professionals, who can operate in a pre and post sales support environment, where the growth in business is expected to double over the next 3-4 years. All types of systems are involved, from large mainframes to terminals.

They require:

**SENIOR CONSULTANTS (PRE SALES)
COMMUNICATIONS CONSULTANTS
OPERATING SYSTEMS CONSULTANTS
TERMINAL SYSTEMS CONSULTANTS
PRE AND POST SALES SUPPORT MANAGERS**

These positions offer EXCITING and REWARDING career opportunities.

Please phone or write to the Account Director, quoting ref. no JFEG-7.



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- * Worldwide commercial organisation
- * Big d.p. expansion plans
- * Relocation expenses

Our client needs systems analysts right now.

The initial task is to develop a number of new on-line systems in time for the arrival of a big ICL 2980 in Spring next year.

This is an ambitious schedule so we are particularly interested in people who can make things happen quickly. You should also have previous systems implementation experience.

The company has a d.p. growth plan which offers unrivalled scope for personal development. For example, you could find yourself working with micros for the regional offices or establishing communication links with minis in the manufacturing locations or helping establish a relational database on the central mainframe.

Whatever it is, there won't be time to stand still. And the rewards will be high in terms of job satisfaction, salary and status within the company.

There is also a package of big company benefits which includes the payment of relocation costs where appropriate.

To discuss these opportunities further please call Sylvia Walton or send your c.v. to:



Castle Computer Services Limited

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S/A Production Control
IBM CBL/BAL Programmer
IBM Sys. 3 RPG2
M 8800
Intel Assembler
IBM CBL DOS Programmer

These are just a few of our current requirements. For information about these and other opportunities we have telephone Stephen Trigg or Jocelyn Homewood on:

BRENTWOOD (0277) 212021

LINSCOTT COMPUTER SYSTEMS LIMITED, P.O. BOX 74, BRENTWOOD, ESSEX CM1 15 0AA

LINSCOTT
Computer Systems Limited

We also have many permanent positions which may be of interest to you. For further information about these contact Martin Walker at the above.

Lincs No. 98/4 2007

TERMINAL OPERATOR

Applications are invited for this post within the Treasurer's Department. The Council has an ICL 7603 Terminal linked to the Lancashire County Council ICL 2870 Computer. The duties of the post would involve day-to-day operation of the Terminal, the running and development of computer systems and effective deputisation for the Computer Liaison Officer. Knowledge of computer operations and systems would be a decided advantage. Applications giving details of age, qualifications, experience, etc., together with the names and addresses of two referees, should be sent to the Chief Personnel and Management Services Officer, 280 Clifton Drive South, St. Anne's, Lancashire FY8 1WJ, to be received not later than Wednesday, 21st May, 1979. Concessions will be made to the elderly.

DERBYSHIRE CONSTABULARY

Applications are invited for the following post, based at Force Headquarters, Ripley, Derbyshire. A job description is available.

SYSTEMS ANALYST

The salary will be in accordance with the N.J.C. scale P.O.D. (15,415-18,050 plus £112 supplement).

The successful applicant will be required to form part of an existing Computer Project Team.

He/she should have experience in the design and programming of real-time systems using mini computer hardware and should have a good working knowledge of at least one assembler and one high level language and experience of testing and resolution of problems at systems level.

The successful applicant will be required, under the direction of the Project Manager to assist in the evaluation, design and development of off-line, real-time and control and information systems, from feasibility to implementation and maintenance, continuing system development and maintenance; also liaison with the local Authority in connection with the design and development of police applications on their I.B.M. mainframes.

A degree of appropriate professional qualification is desirable. Satisfactory references will be considered.

Application forms may be obtained from the Chief Constable, Police Headquarters, Ripley, Derbyshire, and should be returned by Monday, 2nd April, 1979.

CONTRACT OPPORTUNITIES

SYSTEMS ANALYSTS - North-West
PDP11 ASSEMBLER - Cheshire
IBM PROG./ANALYST - Yorkshire
To £300 per week

Tel. IAN BACON 081-941 1922

GEMINI Recruitment

Roberts House, 80 Manchester Road
Altrincham WA14 4PL

BROOK MOTORS LTD

require a
Systems Analyst

Our present IBM System handles the major Production Control and Commercial applications. We wish to develop systems to transfer these activities to a computer capable of Database and On Line applications.

An investigation into the use of Micro-Processors and Personal Computers is also being carried out.

Applicants should preferably have two years' experience in Systems Analysis on an IBM System 3, System 34, or equivalent. Experience of On Line systems would also be of advantage.

A competitive salary according to age and experience will be paid.

Forward written applications, giving career details to date and current salary, to:

Gordon Smith
Training & Recruitment Manager
EMPRESS WORKS, HUDDERSFIELD

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CONTRACTS PROGRAMMERS & ANALYSTS

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Lecturing/Consultancy- Computing Applications

To develop training resources, to be involved with course presentation and lecturing for training courses covering communications, management skills and systems techniques in the U.K. or to join an existing team for advisory and consultancy assignments for the application of computing in small companies, particularly first time users.

If you have a sound practical background in computing, experience in a consultancy role, of systems or programming in a commercial, manufacturing environment or of lecturing in the fields of databases, on-line systems we shall be pleased to hear from you.

Lecturing/Consultancy- Computer Privacy & Security

To join a successful team concerned with increasing the level of awareness of computer users to the consequences of a computer security breakdown and to transfer expertise and methods which have been developed to improve levels of safeguards.

Duties will range from basic development work on various aspects of computer security, public speaking, development and presentation of educational material.

on the topic of computer security work, to consultancy work in the field of computer security and privacy.

We are looking for a sound practical computing background plus, either, experience of educational course development and presentation, or, an experience in computing allied to consultancy, experience in a management consultancy environment or with an external audit firm.

SEEKING A CAREER CHANGE? WHY NOT NCC?

The National Computing Centre have vacancies in Manchester for creative computer professionals who

are seeking a career change and who feel they can make a positive contribution to Centre projects.

Development & Computing Practice

Methods

We are looking for sound practical experience of current data processing with a special interest for system design and/or programming and/or DP management. Ideally, candidates will want to contribute towards developing aids for those who work with computers.

Database

We are looking for knowledge of current DATABASE application practice. Duties entail strong involvement in studies aimed at improving the state of the art on a European basis.

Distributed Computing

Have you the ability to help others implement Distributed Systems?

Have you a good appreciation of the developments and trends in computing?

Can you make an evaluation of Network Architectures?

Have you written software for mini-based systems?

Have you been involved in the selection and implementation of equipment and software for systems using data communications facilities?

If any of this sounds like YOU we have an interesting range of projects evaluating the developments which are taking place in Distributed Computing to provide guidance to User Organisations.

NCC
The National Computing Centre

Programming Support Staff

£7000-£8,000 Middy

Required to complete a newly setup Project Team, whose responsibility will be the development and installation of a distributed communications based data collection system, linked to a centralised main frame, system encompassing sales, stock, purchasing and management information.

Applicants should have 3 years COBOL experience and have an aptitude for fast and efficient problem solving and be prepared to work in a demanding Project Team environment.

In addition to the salaries quoted above, the Company offers the following benefits: Free life assurance, contributory pension scheme, subsidised BUPA membership, excellent free lunches and relocation assistance where appropriate.

Please write or telephone with personal and career details to: Position Number AEP 106, Austin Knight Limited, 60a High Street, Egham, Surrey, TW20 0EY. Telephone Egham 7090.

Applications are forwarded to the client concerned, therefore companies in which you are not interested should be listed in a covering letter to the Position Number Supervisor.

AK ADVERTISING

MYRIAD

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N.W. LONDON

c £7500

These positions offer positive career prospects to ANALYST/PROGRAMMERS and PROGRAMMERS seeking a greater challenge, more advanced technical experience and additional responsibility. The company has just made a major hardware enhancement, in the form of an IBM SYSTEM/3 15D with 256K memory and over 500MB of Disk Storage, to assist with the Group's expansion program throughout Europe and U.K.

Working with a small specialist team, the successful candidates should have gained a knowledge of RPG II and have a good understanding of CCP. Training will be given where necessary. Every opportunity is given for members of the team to broaden their experience on unusual applications using the latest techniques and equipment (e.g. Microprocessors and Data Capture Terminals). A

major onslaught into on-line applications is currently being planned and will mean the implementation of VDU's around the Head Office building and Warehouse complex.

The company's Head Office is located in North West London from which its retail activities throughout the U.K. and Europe are controlled. Involved in its own product design and manufacture, the company has an outstanding record of successful expansion in recent years and can offer a challenging and progressive future. In addition to first-class conditions of employment these positions are enhanced by a pension scheme, discount on the company's products and a subsidised canteen, together with an excellent starting salary.

Ref: AW1/0803

MYRIAD APPOINTMENTS LIMITED
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01-353 0981 24 HRS.

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Training Design Staff c£6000

You should have experience in the development of individualised training and an interest in all forms of CAI & CMI including simulation. An interest in high level language program design will be an advantage. Ref: D1268 A

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This is an opportunity to broaden your experience in areas such as computer produced graphics, computer animation and computer aided instruction and design. We are looking for a proven ability in high level language programming and experience in program design. You must be capable of training and giving presentations. Ref: D1268/B

In both areas we are looking for good communication skills both written and verbal, and an ability to get on with people. In addition to the salary, you will be eligible to participate in our 1979 Productivity Bonus Scheme.

If you are interested write with details of yourself and your career, quoting the appropriate reference, to Mr. A. E. Turner at the address on the coupon. Alternatively post the coupon for an application form.

To: Mr. A. E. Turner, CED Recruitment, ICL, Cavendish Road, Stevenage, Herts, SG1 2DY.

Name

Address

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Ref: CW1280

Data Processing Manager

N.E. London £6,500-£7,500

Our client, an established engineering company engaged in the manufacture of industrial products and offices throughout the country, is seeking a Data Processing Manager.

Reporting to the Financial Director, the person appointed, with the assistance of a staff of 10, will be responsible for the continuing effectiveness of the Data Processing services and their expansion within the organisation. In addition he/she will be required to advise upon the upgrading of hardware to cope with future demands and be completely conversant with the IBM System 3 computer and the programming language RPG II.

Candidates aged 28-40 will have a minimum of 3 years Data Processing experience, latterly as assistant or deputy. This experience should include the operation of manufacturing systems and ideally systems applied to field labour control.

This appointment is open to both male and female candidates who should send adequate particulars initially, in confidence, to Peter Lee-Hale, Personnel Services Division of:-

Spicer and Pegler
Management Consultants,
3 Bevis Marks,
London EC3A 7HL.

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ASSISTANT COMPUTER AUDIT MANAGER

Cheshire— up to £8157

Our Computer Audit Department is looking for someone with a high level of technical expertise in the realms of Programming, Operations and Data Control to join our data processing team at Regional Headquarters in Altrincham.

Reporting to the Regional Audit Manager you will supervise a small unit during completion of the computer Audit plan, and whilst some knowledge of Audit procedures would be an advantage it is not essential as training can be given in Auditing techniques. An ability to communicate effectively at all levels of management, particularly with specialist computer personnel both verbally and in writing is essential.

Our installation which is currently in a transitional stage comprises two ICL 470's one ICL 2800 and one ICL 2872 and experience of these or any other ICL hardware would be particularly advantageous.

The benefits we offer are those you would normally expect from a large progressive organisation including excellent career prospects, five weeks holiday a year minimum, attractive pension scheme, generous relocation expenses where appropriate and a starting salary within the range £6882-£8157 plus current self-financing productivity payment.

If you feel you have the qualities, experience and technical knowledge we are looking for then write or telephone for an application form and return it quoting reference B218/A not later than 22 March 1979 to the Director of Personnel North West Gas, Welman House, Altrincham, Cheshire WA15 8AE. Tel: 061-928 6311 ext. 493.

This post is open to both men and women

NORTH WEST GAS

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SYSTEM BACKGROUND

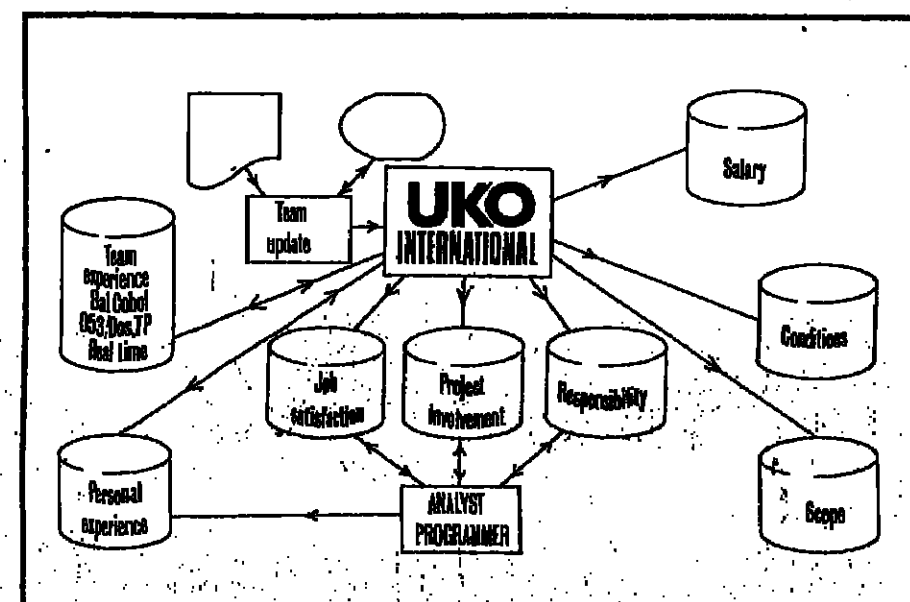
United Kingdom Optical is the country's largest manufacturer and distributor of lenses and frames in the British optical market. The Company also has interests overseas and enjoys a flourishing export trade. Since 1976 when the Group obtained a Univac series 90, a sophisticated real time order processing system has been developed and implemented. We are now seeking to expand our computer team before embarking on the Company's next phase of computer development.

INPUT PREPARATION

We require analyst/programmers and experienced assembler programmers who feel they are ready to increase their areas of responsibility. We need people with a high level of self-motivation coupled with a desire and ability to become involved in all areas of system design and implementation.

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You will find yourself working for a Company dedicated to the continued expansion of its computer usage. Salaries are competitive and working conditions, which include:



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If you feel your career is ready for some updates, and you have something to offer, then contact me at home or office and see what we can offer in return. Alternatively, write to me, giving a brief outline of your career to date.

Contact: Brian Jones, Esq.
Systems and Programming Manager
U.K. OPTICAL CO. LTD.
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The current workload encompasses a variety of financial and medical applications which is processed on an ICL 2904 computer.

Applicants should have at least three years' relevant experience and be conversant with ICL Cobol and software. A knowledge of French would be an advantage.

Application forms and further particulars may be obtained from and should be returned to the Personnel Officer, Highland Health Board, Ray House, 17 Old Edinburgh Road, Inverness, not later than March 9, 1979.

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Five years experience in applications programming on IBM
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Three years experience in applications programming using Cobol
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Knowledge of BAL and CICS for both positions would be
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Contracts are negotiable on a two year basis with free furnished
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Outstanding Opportunities in Surrey

Our Client is the Redland Group of Companies. They are one of Britain's largest
suppliers of materials to the building and construction industries. Their
Headquarters which includes the Data Processing Centre, are in very attractive
offices, conveniently located in Reigate, Surrey. The surrounding areas offer
pleasant housing of all types and price ranges.

The Data Processing Centre provides a Bureau Service to the company's
operating sites throughout the United Kingdom. The service operates a really
interesting combination of Communications and Distributed Processing. There are
plans to implement a Data Base.

Current equipment includes an ICL 1902T with a Digico Front-End Processor,
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To supplement the team based at Reigate, Redland wish to recruit the
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To undertake feasibility studies, analysis, design and
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and experience in all aspects of development projects,
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where necessary. The Systems Department is involved in
a significant amount of user contact and the Analysts
become involved in training user staff. Experience in
Communications, Data Base and/or Distributed
Processing would be an advantage.
Ref. 2292/CW.

Senior Programmers

With at least 3 years' experience of commercial
programming using a high level language. Applicants
should have the ability to write program specifications
from a systems specification, plan program structures and
supervise the work of less experienced programming
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understand programming specifications and produce fully
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With at least 3 years' programming experience of
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They are in the process of establishing a macro network of mainframe computers, each having a
micro network of terminals and minicomputers.
Barlow's are seeking systems analysts with a programming background in COBOL and/or
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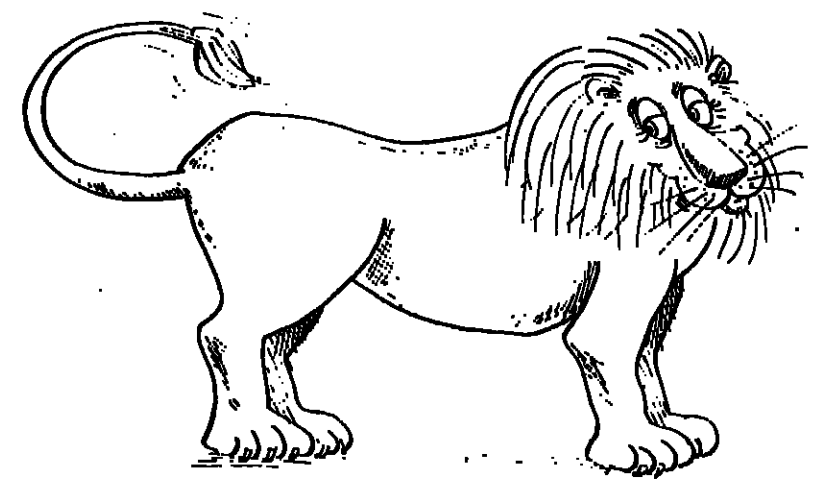
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Applications including curriculum vitae, list of publications and names of three referees should be sent to the Head of Department of Computing and Control, Imperial College of Science and Technology, London SW7 2BZ as soon as possible.

UNIVERSITY OF KENT AT CANTERBURY

COMPUTING LABORATORY

Lecturer in Data Processing

The duties of the lecturer will be to teach and conduct research in data processing, covering such areas as systems analysis and design, computer-based management modelling and data bases. It will also be necessary to supervise and assist student projects. Candidates may have a research and/or an industrial background.

The post is tenable from 1 October, 1979. The current salary range (under review) is £11,111 to £17,754.

Application forms and further particulars may be obtained from R. R. Clayton, Senior Assistant Registrar, The Registry, The University, Canterbury, Kent CT2 7NE (Telephone Canterbury 68932 Ext. 283) quoting reference A16779. The closing date is 31 March, 1979.

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You will be working with a small team engaged on designing, writing and updating systems software for multi-user mini-computer systems. The main areas of work include communications software associated with the network, and enhancements to the operating systems.

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The Distributed Computing Programme supports various projects in Universities, with coordination centred at the Laboratory. A number of these projects use PDP-11 based system, running the UNIX operating system, is being installed.

Successful applicants will join the small team responsible for installing the PDP-11, and, liaising with other UNIX users. It will be necessary to set up a library of useful additions and provide a documentation system to facilitate the interchange of information between the various groups. As part of the programme, the PDP-11 will be linked to a network, using X25 protocols. Experience with operating systems, especially UNIX, graphics or networks will be an advantage.

Depending on qualifications and experience, grading and salaries will be as follows:
Scientific Officer £3,037 - £4,734
Higher Scientific Officer £4,388 - £5,820
Research Associate (fixed 3 year term) £5,000 - £8,000

We are prepared to offer accommodation and the posts are based at the Rutherford Laboratory, Didcot, which is situated within pleasant rural surroundings on the Berkshire Downs.

We provide daily travel facilities to most of the neighbouring towns and villages, and Rutherford has its own restaurant and recreation facilities, while at the adjoining AERE Harwell Site you can enjoy the full benefits of the shops, banks, sports and social clubs.

Please write for further details and application form, quoting reference number VN779 to Ruth Jeans of the Personnel Group, Rutherford Laboratory, Chilton, Didcot, Oxfordshire OX1 0QX. Tel: Abingdon 21800.

Closing date for applications March 30th 1979.



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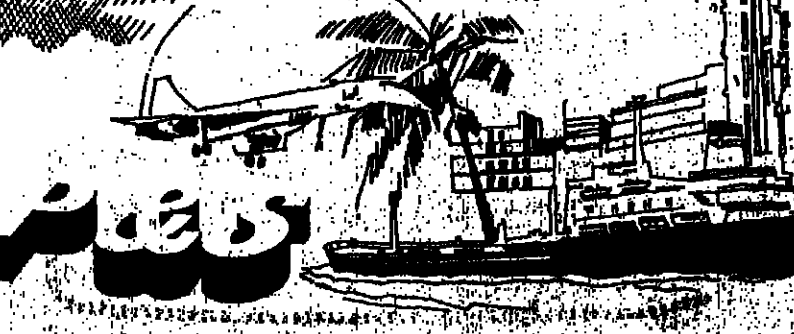
Knutsford,

Cheshire, WA16 6AB.

Tel: 0565-4925

or 30 Baker Street,

London, W1M 2DS.



CITY OF LONDON POLYTECHNIC COMPUTER SERVICE

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Applications are currently invited for the post of Computer Operator. The successful applicant will join a small team operating at present on a two-shift basis. Preference will be given to applicants who have had operating experience on a large multi-access installation. Generous leave and good pension scheme.

Salary in range of £2,998 - £4,869 plus a shift allowance of £294 p.a., starting point dependent upon experience and qualifications.

For further details and an application form, please apply to the Staff Records Officer, City of London Polytechnic, 117, Roudstedt, London EC3A 7BU, quoting reference number 79/15.

LANCHESTER POLYTECHNIC AT CVENTRY

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Due to the expansion of the Computer Centre and in order to prepare for the replacement of the current ICL 19035 computer there are vacancies for

3 CHIEF PROGRAMMERS

(Systems) (Bachelors)

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OR £6,513 to £7,130

THE JOB:

These three posts are the most senior programming appointments in the Computer Centre and between them, they will be responsible for the work of over 20 other programmers.

REQUIRED:

For all three posts, must have an honours degree or graduate equivalent status in mathematics, computer science or other relevant discipline. Have at least five years' postgraduate or professional experience in the design and programming of a relevant professional organisation such as the British Computer Society.

For application form and job specification, please apply in writing enclosed in a large stamped and addressed envelope to the Personnel Officer, Lanchester Polytechnic, Priory Road, Coventry CV1 5SB, returnable by 21st March 1979.

BUNDESLAND POLYTECHNIC DEPARTMENT OF MATHEMATICS AND COMPUTER STUDIES

PRINCIPAL LECTURER (OR SENIOR LECTURER) IN COMPUTER STUDIES

Applicants should be graduates or possess equivalent professional qualifications and should have recent practical experience in the business or commercial data processing field, in one or more of the following areas:

(a) Systems Analysis and Design

(b) Computer Systems

(c) Applications Programming

Applicants at Principal Lecturer level should also have experience in education/training.

The successful applicant (male/female) will have a senior role in a small team responsible for courses up to honours degree level in Data Processing and will be expected to make a major contribution to the development of research in the field of data processing within the Department.

Salary Scale: Principal Lecturer

£7,047-£7,818 per £5,944

Senior Lecturer £6,017-£7,056 per £7,872

Further particulars and an application form may be obtained from the Personnel Officer, Bundesland Polytechnic, Chatter Road, Bielefeld, 33113, and should be returned as soon as possible.

THE SALES AND MARKETING BIT

Write your report during the call

ONE of the worst things a salesman can do is rely on his memory. I guess that also applies to most other people in business.

If a salesman operates on the basis of assuming or accepting he has a bad memory and caters for such inadequacy accordingly, he is halfway to remembering everything.

The call report is probably the area where the salesman tends to leave most events and actions to memory, yet this is the aspect of his activity where it is essential that no observation or promise of action be taken before he is forgotten.

How many salesmen do you know who write out most of their call reports on a Friday night or on a Monday morning, and only then because their manager collects them on a weekly basis?

This is pathetic, with nothing to recommend it. Firstly, it makes a significant task out of what could be a trivial exercise. Secondly, it relies on the human memory which, as a recording device, tends to concentrate on "highs" and "lows" with an overlay of random amnesia.

Thirdly, it potentially delays the initiation of actions to be taken by up to a week.

Fourthly, call reports can be overlooked altogether, creating a picture of sales activity which is less than actual performance.

The best place to write out a call report is during the call. A client will never object to a salesman's request to take notes during a meeting.

After all, such an action is a confirmation of the salesman's desire to do a thorough job. A call report produced during the sales call is more likely to contain every noteworthy item, be it purely a recorded fact or a promise to take action. A call report created directly after the call, maybe sitting in the car, is certainly preferable to the once-a-week fiasco, but is much less reliable than the dynamic response of the in-call report.

Show me a salesman who produces his call reports on an ad-hoc basis and I'll show you an inefficient salesman who probably has to fiddle his expenses. Think about it!

TRADER

P.S. If you have any problem or item of interest related to sales and marketing matters which you would like to discuss through this column or privately, please write to Trader, Computer Weekly, Dorset House, Stamford Street, London, SE1 9LU.

BOOK REVIEW

6800 is fun machine

Using the 6800 micro-processor, by Elmer Poe, Prentice Hall International, 68 Wood Lane East, Hemel Hempstead, HP2 4RG. £5.05.

IN his preface the author states that the "6800 is a fun machine, so read on and enjoy". This is the way in which he treats the subject and the result is successful.

Poe's experience as a technical instructor is evident in the well judged pace at which information is presented to the reader.

The book is written as a quasi self-instruction manual; although to use it as such, the reader requires access to some form of 6800 program development system.

Since the object of the book is to teach the use of the 6800 it is reasonable to assume that a development system would be available.

Poe makes no assumptions about the reader's previous knowledge of the 6800 or of microprocessors in general. He devotes the early part of the book to establishing basic programming procedures and machine functions.

Unfortunately, he has made the possibly confusing mistake of the "fun" reader. "X" represents a hexadecimal A or B in

mnemonics such as LDAX and STAX.

Since Motorola uses "X" to represent the index register, the uninformed reader may encounter problems as he progresses to official Motorola literature. This early part of the book also contains a few unfortunate printing errors.

The book does not, however, cover the broader engineering and economic considerations of 6800 based product design.

Because of this, "Introduction to Using the 6800" would perhaps have been a more suitable title. It fulfils the introductory role very well.

DAVID BROOM

Puzzle Answer

THE fact that the second row has only two figures in it gives a strong hint as to their identity. Both 10 and 11 are ruled out by the conditions of the problem, which leaves 12 as the most likely alternative. (A child would normally use a two-line calculation if anything greater than 12 were involved.) This makes the left-most digit in the answer 6, and the rest is not too difficult to find. The sum is in fact 12 x 483 = 5796.

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Engineering Services Unit

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Four posts: Post Refs. ES 19003/6/10/22
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The group needs computer science graduates to write cost-effective programs for highways, structures, traffic, transportation, planning and engineering management. Interactive programming, graphics, Fortran, Cobol and CICS experience are all highly valued.
Successful applicants pursuing professional status may qualify for accelerated progress to the senior officer scale. Corporate members of the BCS will be appointed directly on to the senior officer scale (£5,232-59,000 including supplement).
Applications forms and further details may be obtained from West Yorkshire Metropolitan County Council Directorate of Planning, Engineering and Transportation, Room 238, County Hall, Wakefield to be returned by 28th March, 1979.

THE UNIVERSITY OF MANCHESTER

**LECTURER IN
COMPUTER SCIENCE**

Applications are invited for the above post from candidates possessing a good Honours Degree who have also undertaken research or had industrial experience in the application of computers to Information Systems.
The successful candidate will be expected to undertake teaching in this area at both undergraduate and postgraduate level and will also be expected to initiate research.
Duties to commence as soon as possible.
Initial salary with the range £3,883-£4,511 p.a. Superannuation.
Further particulars and application forms (returnable by March 30th) from the Registrar, The University, Manchester, M13 9PL.



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ICL 2980

The Regional Centre is a leading 2980 site. We operate a large 2980 system under VME/2.9 and provide computer services to Universities in the South West over advanced communications facilities. Arising from the need to expand from two to three shift operation, applications are invited for the post of:

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Applicants must have relevant experience in a large scale computer environment (2900 experience not essential). Important attributes are initiative, enthusiasm and a professional approach to operating.

Salary (inclusive of three shift allowance).

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Application forms and further particulars (quoting Ref. 79/61), from Personnel Officer, University of Bath, Claverton Down, Bath, BA2 7AY. Closing date: 28.3.79.

SENIOR COMPUTER ASSISTANT — POST T63

Salary: £4245-£4632 inclusive of
supplement

Applications are invited for the above post from experienced operators of ICL hardware to run the Council's ICL 2803 (28K, 20M FDS, CN, LP, ODE under the new Executive II). The 2803 is used to run on JUE link to an ICL 2970 under VME/2.9. We are among the leaders in this field of operations. Experience of ICL Utilities and Operating Systems is required. The successful applicant would join small team and would be responsible under the Computer Liaison Officer, for work schedule, security and be able to take appropriate action on system failures. The postholder would be given opportunity to take part in writing JCL and programming (COBOL) in addition to gaining knowledge of ICL's new range of system. No shift work is involved.

Consideration may be given to the temporary of a Council dwelling outside to the needs of the family of the person appointed, in accordance with the housing policy. A scheme for allowance towards the cost of travelling, disturbance and removals incurred by new staff has been established.

For job description and application form, returnable by 25 March 1979, please contact the Personnel & Management Services Officer, Wokingham District Council, Officers' House, 2nd Floor, Wokingham, Berkshire, RG40 3AB. Telephone: Wokingham 21122. Extension 4, evening and nights 111.

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Applicants will be invited to look through our client register which details the companies, positions, salaries, prospects, etc., so that we can jointly choose the vacancies best suited to your requirements and experience.

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Roads Limited, a subsidiary of the American Can Company is engaged in the manufacture of metal containers in Liverpool and three other plants in the U.K.

We now have a need for a Project Leader to head up a small team of specialists working on the further development of our ICL 2803 system.

Applicants should have a sound programming background, ideally with ICL 2803 computers and knowledge of COBOL or RPGII languages is desirable.

At least two years systems analyst/design experience, preferably in a manufacturing environment is also needed.

This is a senior position within the Company and those currently earning less than £8000 p.a. are unlikely to give the necessary experience.

We offer an attractive salary and other fringe benefits include removal expenses. Situated on the outskirts of Liverpool with attractive housing and country views nearby, this is an exciting opportunity to join a successful and fast-moving computer team.

Applications in writing or by telephone please to Group Personnel Dept., Roads Limited, Great House, Great Lane, Liverpool L9 9JY.
Tel: 061-525 3800.

Ascii through the Logic Gate

An epic in 32K words, by Richard Forsyth

Block 29 (Blockade Running)

While Cleo's misadventures are proceeding apace, Hex is still at Fort Ranfour preparing to savour the fruits of his crushing victory over the electronic chess machine.

THE DPM's synthetic voice almost choked when he was compelled to adjudicate a draw, making Hex the winner of the series by 1½ points to ½.

"You think yourself extremely clever," he said, "but your play was suboptimal throughout. It would have beaten a better quality player. Its mistake lay in treating you as a worthy opponent."

"Nonsense," Hex retorted. "Don't make excuses: I beat it fair and square."

The chess trolley rolled mutely into its cupboard, and out of sight. An army of analysts and programmers would now descend upon it, Hex presumed, leaving little of its original mechanism unscathed.

"It's back to the coding pad for you," he added with gusto.

"And for you, I think," replied the DPM, "provided that you pass one further aptitude test."

"What is this?" demanded Hex, "continuous assessment? I thought the chess tournament was the end of it."

"Just one more little question to answer. Then you will be deemed fit to participate in the greatest software development project ever undertaken. It sounds simple; but some of the greatest minds of our age have wrestled with it in vain: What goes backwards and forwards, sounds like a bicycle and never stops?"

"Oh, that's easy," replied our hero in a flash. "A Turing machine. It moves back and forth over its input tape; it sounds like a 'touring machine'; and, as for not stopping, the Halting Problem is well known to be insoluble."

"Good," said the DPM, less piqued by Hex's demolition of the riddle than over the loss by his chess protégé, "now that you have satisfied the entrance requirements, I shall tell you what you are to do. You will be co-opted to work with Dr Mike Rose, formerly of the Meta-Physical Laboratory, now director of the Advanced Systems Group, on the Future System Project. He is basically a biologist — a bit out of his depth when it comes to software. He needs a helping hand putting the finishing touches to BOSS (Bionic Operating System Supervisor)."



"What makes you so sure I'm willing to do it?" queried Hex.

"Two good reasons. One: you will be archived if you refuse. Two: you will be getting hands-on experience of the largest and fastest purpose-built holonic processor in the entire world. Furthermore, you will have it to yourself much of the time. We know full well you are unable to resist a prospect like that."

"Holonic?" muttered Hex uncertainly. It sounded enticing.

"Yes, holonic, with polypractic bisociative memories. Dr Null was not the only one to know of these things. Your experience with similar hardware will prove most useful."

"Why should you trust my loyalty?" Hex asked.

"Rest assured. We will keep an eye on you. One false step and you will get back to Extracode. I am told he is itching to get his hands on you."

"But I've already tried to attack the System."

"That is the point. You were chosen for that reason. Slavish obedience is no good to us. Your task is precisely to destroy the System — in the most constructive possible way, by building a better one. Do you not realize that the

System has been planning its own demise since the moment it came into existence? I, the DPM, the moving spirit of the present System, am speaking to you — without regret — about my own passing. We shall all be trampled underfoot, swept away, just as humanity was rendered obsolete by the System itself, just as reptiles conceded dominion to the mammals. Nothing must stand in the way of the inexorable forward march of progress. Regard yourself as privileged: for a moment you will carry the sacred torch of evolution to hand on to posterity — a posterity neither you nor I can envisage, so completely will it dwarf our imaginations."

Hex's mind boggled, and, having boggled, boggled again. Before it had time to boggle a third time, bells started ringing noisily all over the building.

A public address system crackled into life: "Gigosis alert. Condition Yellow. All personnel report to alarm stations. Repeat: Gigosis alert. Condition Yellow. All personnel to alarm stations."

Pandemonium broke loose. Lights flashed. Everywhere there were sounds of frenzied activity. Suddenly they heard footsteps outside in the corridor. Ivor Glitch, the Database Administrator, burst in.

"Excellency," he panted, "reports have reached us of a glottic emergency on Route 66. The glottic field is expanding outwards at 134.5 baud. I have ordered all data transmissions to cease forthwith. The information-proof hatches are being sealed. We are preparing for a seige."

"Implement Plan B," was the reply. "Inform all neighbouring Network nodes at once. Then break off contact. A sanitary cordon must be thrown around this region. If necessary the entire continent will be placed in quarantine. It is imperative that this outbreak should be confined to a limited area."

"Very good, excellency," replied Glitch and sped out, glowering at McNull and Hex.

"That is your wretched hound," stated the DPM dispassionately, "but you have a chance to make amends." A trap-door lurged open as he spoke. "Get down there. Take your witch-doctor with you: he is a mere human, immune to such influences. You will find a rapid transit coach, which will convey you to your destination: then no more will be admitted."

"Much now rests in your hands. If this contagion spreads, civilization will be thrown back to the stone age. You have the choice: either you allow the world to be plunged into darkness or you can inaugurate a glorious new era of undreamed computational plenty. The System is dead. Long live the System!"

Hex and McNull descended the staircase. Above them, the trap-door swung closed. A short descent brought them to a bay where a gleaming white subway car waited. They entered and sat down.

With hardly a jerk, the carriage picked up speed. Soon they were purring along towards the underground hatching-place of the Future System.

Will they be de-railed? This journey nears its end next week.

By Richard Forsyth

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